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BISMUTHYL IODIDE.

Comparative Value of Methods Proposed Heretofore, with an Improved Method for its Preparation.[1]

By Charles E. Greene.

Bismuthyl iodide was introduced into hospital practice in New York by Dr. A. Sidney Reynolds, about ten or twelve years ago under the name of "Bismuth-subiodide or oxyiodide." It was used for the local treatment of chronic ulcers, syphilitic sores, eruptions, etc., etc. It was said to be more efficient than iodoform, with none of the saffron-like and almost intolerable odor, so characteristic of the latter. Dr. Reynolds also claims that it will "control inflammation, allay irritation, suppress suppuration, promote granulation and induce cicatrization;" and that it is "almost a specific in gonorrhœa, and general mucous inflammations," etc. Internally it is strongly recommended in gastric ulcers, gastritis, and typhoid fever.

The objects had in view in the prosecution of the work as presented by this paper were, first, to ascertain the amount of true BiOI in the commercial article sold by the name "Subiodide of Bismuth;" second, to test the various methods proposed for the manufacture of the compound, and also to ascertain the percentage found in the products obtained by these methods; and third, to devise, if possible, a new method for its preparation that would yield a better result than any as yet known to myself.

The information which I was able to obtain, both as to the effect and as to a satisfactory mode of preparing bismuthyl iodide, was not

[1] From an inaugural essay presented to the Maryland College of Pharmacy, 1889.

only very meagre, but very unsatisfactory, indeed. Although considerable has been written on the mode of preparation, yet, after a great number of experiments, no one seems to have obtained a thoroughly satisfactory result. None of the products obtained were of sufficient purity, and none of the methods employed were without some serious objection; yet these investigations were made by some of the best pharmacists in our land. How far I may have been successful in my efforts in this direction I leave for others to judge. At the time of Dr. Reynolds' experiments the high cost of the compound prevented its general adoption; therefore the main point for consideration was a process by which a chemically pure compound could be obtained at a price sufficiently reasonable to bring it into general use.

The first commercial sample which I examined, was of a very dark brown, almost chocolate color, with nothing of the characteristic brick red color which it should have, indicating the presence of a considerable quantity of iodine in other form of combination than BiOI, most probably as BiI_3. When boiled with an excess of water it assumed a much lighter color, finally a bright brick red, owing to more perfect oxidation, one atom of oxygen from the hot water replacing two of iodine forming a molecule of BiOI. When heated to 100° C. no apparent change took place, only a slight odor of iodine becoming perceptible. As the heat was slowly raised to cause partial decomposition and as the iodine was slowly liberated the compound gradually assumed the brick red color. By analysis I found that it contained 48·36 per cent. of iodine, or about 12 per cent. more than a pure article should contain, and we may justly draw the conclusion that this is a very indefinite and, therefore, unsatisfactory compound.

The next sample examined was, like the first, of American manufacture. It was dark-red in color, dense and heavy, and exhibited a few lumps of a lighter color. It contained 91·83 per cent. BiOI, with a small amount as $BiONO_3.H_2O$. One other sample was examined, but it did not differ from the one just spoken of, except that it had been more carefully powdered and contained 92·61 per cent. BiOI, and a small proportion of $BiONO_3.H_2O$.

Of the various processes set forth in journals and books of reference, I have tried several with varied success. The first tried was the so-called method of "precipitation," proposed by Jos. W. England, in AMER. JOUR. PHAR., Jan., 1887, pp. 9–15. The product

by this process was of a fairly good color, but slightly darker than some other specimens, cakey, and very difficult to pulverize finely. The chief disadvantages of this method are, that the water being hot and the acid solution not being sufficiently diluted, a very appreciable quantity of iodine was liberated as vapor, giving the supernatant liquor a distinctly violet color, and readily recognizable both by the odor and by the starch test. By analysis I found the compound made by this process to contain 97·65 per cent. BiOI.

The next method was devised by R. Rother (AMER. JOUR. PHAR., Aug., 1887, pp. 390–391). Theoretically this is certainly a good method. It yields a product of a dark red color, heavy, dense, and rather hard to pulverize finely. It contains 95·3 per cent. BiOI, with 3 or 4 per cent. $BiONO_3.H_2O$; but, to say the least, the process is rather tedious and the resulting compound not so satisfactory as desired.

The next method tried was that of precipitation with hydriodic acid and freshly prepared bismuth hydroxide, as proposed by Frank X. Moerk (AMER. JOUR. PHAR., June, 1887, pp. 273–274). The author states, "the oxyiodide so obtained is of very fair color, and contains no water of crystallization." In this product, as in all others which I examined, I found no water of crystallization. That which I obtained was very tough, almost unpulverizable, heavy and cakey. So far as chemical composition is concerned it was as good as the average samples found upon the market, containing 92·9 per cent. BiOI, with some $BiONO_3.H_2O$, as in the others. But the process not only occupies too much time, but requires a great deal more skill and care than is necessary to produce a very much better article.

The next process tried was devised by the same author as the preceding one, and consists in boiling certain quantities of $BiONO_3.H_2O$ and KI together without the presence of an acid; and, as the preceding one was remarkable for being complicated, so this one is justly celebrated for being extremely simple. In devising these manipulations the author has surely touched both extremes. "The (supposed) *advantages* of this method are, first, the avoidance of *free acid;* second, its definite composition; third, a higher percentage of BiOI." The first advantage (?) I readily admit; there certainly is no *free acid* present. Yet this could be considered a good method provided the two latter advantages claimed were true for the resulting compound. The samples made by myself, after boiling for more than an

hour, were found to contain only 27·6 per cent. iodine, making the resulting compound represent 76·66 per cent. BiOI, with a large amount of $BiONO_3.H_2O$, showing conclusively that large quantities of KI remained undecomposed and were lost in the washings, and that there is nothing "definite" in its composition. The washings, when tested with a solution of $AgNO_3$, gave a copious white, curdy precipitate of AgI.

Several samples were made by various other methods, as by "trituration," etc., but none of these were satisfactory, having various percentages of BiOI, from 88 to 95 per cent, with "*uncertain*" quantities of $BiONO_3{\cdot}H_2O$, differing in no special way from those already spoken of.

Of all the methods so far considered I had found no one that was entirely satisfactory. The method of "precipitation" seemed to be in all respects better than any of the others, yet it was far from being perfect. In experimenting upon this process I found that it should be modified as follows: Dissolve 409 grs. $BiONO_3{\cdot}H_2O$ in 1 fluid ounce HNO_3 with the aid of heat, as is stated in Mr. England's formula; then carefully dilute this solution with water as long as $BiONO_3$ is not reprecipitated, or, at least, until it has assumed a slight permanent opalescence. Add to this 221 grs. of KI, dissolved in about 16 fluid oz. of *cold* water, in a large flask or some suitable vessel, agitate thoroughly, and *then* apply heat, *but not to the boiling point*, (about 80°–85° C.). The mixture at first assumes a black color, growing gradually brownish, becoming still lighter as it is agitated, and under the influence of *moderate* heat and violent agitation it is finally changed from a light brown to a brilliant red. The agitation is continued for a few moments longer that the reaction may be completed. The precipitate is washed by decantation, drained upon a plain filter and dried at 100° C. The yield should be about 470 grs. The whole operation is completed in a very short while. No iodine is liberated, and hence the product contains a larger and proper percentage of it, and represents a pure article of BiOI.

Bismuthyl iodide so obtained is of a very bright red color, almost vermilion, and has the additional advantage of being in very fine powder, light and bulky, admirably adapted for use as a dusting powder or dressing, an advantage possessed by none of the other specimens. By analysis I found it to contain 35·8 per cent. of iodine, making 99·44 per cent. BiOI, with only ·35 per cent. $BiONO_3.H_2O$.

The reaction taking place in the above is most likely as follows:

(1) $BiONO_3.H_2O + 2\ HNO_3 = Bi\ 3\ NO_3 + 2\ H_2O$.

(2) $3\ (Bi\ 3\ NO_3) + 3\ KI = BiI_3 + 2\ (Bi\ 3\ NO_3) + 3\ KNO_3$.

(3) $BiI_3 + 2\ (Bi\ 3\ NO_3) + 3\ H_2O = 3\ BiOI + 6\ HNO_3$.
(heated—)

The mode of analysis which was pursued in these experiments, is as follows:—

For estimation of Iodine.—Place 0·5 gm. BiOI in a flask with a few pieces of test zinc, cover with water, and mix thoroughly, then add sufficient H_2SO_4 to evolve hydrogen slowly, at the same time decomposing the BiOI. Thus *H* combines with *I* to form hydriodic acid, while $ZnSO_4$ is formed and Bi is precipitated in black flocculent masses. This reaction is completed in two or three hours. Neutralize the resulting mixture carefully with KHO, add a few drops of solution $K_2\ CrO_4$ as an indicator; titrate with one-tenth normal solution of $AgNO_3$ until a red precipitate begins to form. The percentage of iodine is then calculated as by U. S. P. process.

For estimation of Bismuth.—Dissolve 0·5 gm. BiOI in a small quantity of nitric acid, dilute with water, boil until all iodine has been vaporized and all odor of HNO_3 has disappeared; add to this KHO, until a precipitate is formed which does not redissolve on shaking. Collect on a plain filter, wash well, ignite and weigh as Bi_2O_3.

MEDICINAL CATECHU.

By Edwin Stanton Reider, Ph.G.

From an Inaugural Essay.

The examination and estimations presented in this essay were undertaken with the view of ascertaining the medicinal worth of catechu as it is found in the drug market. Eighteen samples were obtained from various sources and the results gotten from these were considered to be a fair indication of the condition of the drug in general.

Samples 1 to 6 were in powdered state, the remainder were in mass. Nos. 1, 2, 7 and 8 were obtained from Baltimore, Md., direct from the jobbers. Nos. 11, 15 and 16 from the same city, but received through retailers. Nos. 5 and 9 were procured from a wholesale drug-house in New York City. The remaining samples were

all gotten in Philadelphia; Nos. 10 and 14 from retail pharmacies, the remaining eight from prominent wholesale establishments. Concerning No. 17, it might be stated that it is neatly put up in four-ounce packages and labelled "Catechu Pallidum."

The impurities which these examinations disclosed consisted mainly of leaves, sticks, pebbles and dirt of various sorts. The possibility of the presence, in the drug markets, of catechu that had been treated with potassium-bichromate for dyers' use—as was pointed out in a recent paper (AMER. JOUR. PHARMACY, Oct., 1888), was the incentive for a thorough search, in each sample, for this dangerous impurity, but its absence was proven in every instance. By reference to the appended table it is seen that the moisture ranges from 7·99 per cent. to 14·47 per cent., the powdered samples containing an average of 11·63 per cent. and those in mass 11·65 per cent.

The average yield of ash was very large, No. 14 giving 19·61 per cent., the largest. This sample consisted principally of sticks, leaves and sand, hardly meriting the name catechu. No. 7 showed the lowest ash percentage, *viz.*, 1·67 per cent.; four other samples yielded less than 3 per cent. No. 17, when ignited for ash gave off a strong odor of burning nitrogeneous matter, and when a portion of the sample was dissolved in hot water the solution had a decided and strong cheese-like odor.

It was noticeable that those samples giving the highest ash percentage also contained iron in the largest proportions, this being especially true of Nos. 2, 9, 14 and 16, all of which gave evidence of its presence in large amounts. The other samples also contained iron in varying amounts, some, notably No. 18, showing its presence but slightly. Nos. 1 and 2 also had aluminium present in small quantities.

The catechu estimations were made as follows: A 1 per cent. solution (0·5 gm. in 50 cc.) of the catechu, in hot water, after cooling, was shaken up with successive portions of stronger ether, the ethereal layer separated after each treatment; these several ethereal solutions were then mixed together and the ether evaporated. The ethereal residue was again treated with stronger ether to dissolve away the *catechin* from that portion of the aqueous extract which had remained mixed with the first ethereal solutions. This last solution was again evaporated, the residue being pure catechin. As the table shows, the yield of catechin was quite small, the greatest amount obtained from

sample No. 11 being 16·50 per cent. The superiority of this specimen over the average commercial catechu was shown also by its dissolving in hot water almost without insoluble residue and giving a very light colored solution. No. 7, although giving a small proportion of catechin, yielded it in a most attractive crystalline form.

To sum up these results, we find that the catechu generally present in the drug market contains small proportions of catechin and correspondingly large amounts of impurities; almost invariably contains iron, and, as far as these results indicate, none has been found to contain potassium bichromate.

Following is a general synopsis of the results obtained:

Sample.	Moisture.	Ash.	Catechin.	Remarks.
1	10·16 per cent.	3.77 per cent.	3·73 per cent.	Iron, trace: aluminium, trace.
2	10·30 "	13.35 "	4·60 "	Iron, considerable; aluminium, trace.
3	14·18 "	3·10 "	7·20 "	Iron, trace.
4	9·57 "	2·99 "	2·60 "	Iron, trace.
5	13·14 "	5·83 "	1·53 "	Iron, trace.
6	12·44 "	4·31 "	4·20 "	Iron, trace.
7	14·47 "	1·67 "	2·40 "	Iron, trace.
8	9·12 "	2·39 "	5.40 "	Iron, trace.
9	15·13 "	4·88 "	1·20 "	Iron, considerable.
10	14·14 "	2·18 "	5·20 "	Iron, slight trace.
11	12.15 "	6·82 "	16·50 "	Iron, trace.
12	9·47 "	2·40 "	3·00 "	Iron, slight trace.
13	13·13 "	4·62 "	4·80 "	Iron, slight trace.
14	7·99 "	19·61 "	2·20 "	Iron, considerable.
15	8·57 "	3·88 "	3·00 "	Iron, trace.
16	12·00 "	5·88 "	3·80 "	Iron, considerable.
17	10·82 "	5.04 "	1·00 "	Iron, trace.
18	13·57 "	3·08 "	2·80 "	Iron, very slight trace.

AN ADULTERATION OF GROUND FLAXSEED.

By George M. Beringer, Ph. G.

Read at the Pharmaceutical Meeting, March 21st.

A sample of ground flaxseed recently offered showed upon examination the following peculiarities: With iodine, the decoction gave a copious reaction for starch; it yielded to petroleum ether 20·92 per cent. of oil; ash, 3 per cent. On examining the sample microscopically the starch was identified as that of corn.

A sample of pure ground flaxseed gave no reaction for starch, and yielded to petroleum ether 32.97 per cent. of oil; ash, 4·5 per cent.

The sample offered was evidently adulterated with corn meal to the extent of about forty per cent., judging from the small yield of oil and ash.

A sample of corn meal examined yielded to petroleum ether only 2·65 per cent. of oil; ash, 1·2 per cent.

The adulteration of ground flaxseed with such material is likely quite common, and may be easily detected by the test for starch. It is a well-known fact that, although flaxseed may contain starch while growing, in the fully matured seed the starch is entirely converted into albumen and oil. The writer suggests that the Pharmacopœia should require flaxseed to give with iodine no reaction for starch. As most flaxseed yields considerably over 30 per cent. of oil, I am also of the opinion that the Pharmacopœia should require it to yield not less than 30 per cent., instead of 25 per cent., as in the present edition.

OLEATE OF MERCURY.

By A. P. Brown, Ph. G.

Read at the Pharmaceutical Meeting, March 21.

Several years ago Dr. Wolff read a paper on "Oleates" (see American Journal of Pharmacy, 1881, p. 545), and recommended them to be made by decomposing sodium oleate (white castile soap) with a soluble salt of the desired metal. For instance, to make oleate of zinc, a solution of acetate of zinc is added to a solution of oleate of sodium; a white precipitate will fall which, when washed and dried, is termed powdered oleate of zinc. For making oleate of mercury, a solution of oleate of sodium is added to a solution of bichloride of mercury, the mixture becomes milky and in order to separate the oleate of mercury it is necessary to boil the mixture until the oleate forms a yellow mass, when the remaining liquid is poured off and the oleate washed with water, transferred to an evaporating dish and on a water bath heated until all the water is driven off.

Now, in preparing oleate of mercury according to this process, the continued boiling will decompose the oleate and a black precipitate will also form, and instead of being of a beautiful yellow color, a dark mixture resembling mercurial ointment would be the result, consisting of a mixture of oleate and oxide of mercury.

Having occasion to use considerable quantities of oleate of mercury made by this process, I was anxious to have a nice reliable preparation for dispensing, and it occurred to me that the process might be improved by adopting the following plan:

Take of white Castile soap, in fine powder, ℥viii; bichloride of

mercury, in fine powder, ℥iij+℥ij. Mix them carefully together in a mortar and add distilled water sufficient to form a pasty mass; throw this immediately into boiling water, and boil carefully until a yellow oily liquid is formed; allow to cool, pour off the water and wash the resulting oleate with distilled water until tasteless; place it in an evaporating dish and on a water bath heat until all the water is driven off. By following this process an oleate of mercury will be obtained resembling very much recently prepared citrine ointment. This can be diluted with lard or lanolin to any desired strength. In a paper by Dr. Shoemaker these oleates are recommended to be used in skin diseases; and in speaking of oleate of mercury, he calls it a pure oleate of mercury, and recommended it to be diluted when used; for instance, to make a twenty-five per cent. ointment, it was to be diluted to one-fourth; or for a twenty per cent. ointment, to be diluted to one-fifth. He recommended lard as the best diluent; vaselin or cosmolin being not so readily absorbed as lard. In my experience I have found lanolin to be the best diluent, as it is more readily absorbed than any of the above. On the table are two specimens of oleate of mercury—one proposed by Dr. Wolff's process, and the other by the modified method. They are both over a year old, and perfectly sweet, as on the day they were made.

OLEORESIN OF MALE FERN.

By Wm. G. Greenawalt, Ph. G.

"Ethereal oil of male fern deposits a sediment. Is this, or the overlying oil, the active portion?" About six years ago this question appeared in the list of queries published by the American Pharmaceutical Association, and thereafter appeared in each successive list for the next two or three years, when it was finally dropped without any investigation having been made.

In the fall of 1885, my attention was called to the query, and I determined to investigate and if possible find which is the active portion. The U. S. P., and all the literature I could find on the subject, concedes to the sediment active properties, directing it to be shaken up with the oil before administration.

The first thing to be done was to separate the sediment from the oil, and for this purpose various liquids were tried, in order to select the best. Chloroform dissolved both oil and sediment, forming a clear

liquid. Deodorized benzin and absolute alcohol both seemed to answer very well with the small portion tried; but anxious to know whether there was a difference, I experimented further, and found that after dissolving the oil and decanting, then washing the sediments with the respective liquids until the washings were nearly colorless, and then drying the sediments, that the quantity of sediment from the benzin was much greater than the yield from the alcohol, had more color, and seemed to consist principally of resinous matter, with a few white specks mixed with the brown powder. The quantity of sediment from the absolute alcohol was comparatively small, and consisted largely of the white portion, with a small quantity of the brown powder.

The quantity of the oil from the benzin was correspondingly smaller, as the yield of sediment was larger than that from the absolute alcohol, and consisted principally of the oil, while that from the alcohol deposited after standing several weeks quite a quantity of resin, which I found to be insoluble in benzin, thus explaining the larger yield of sediment from the benzin.

As I desired to separate the sediment I concluded from the above, that deodorized benzin would be the better liquid, and prepared several doses in this manner.

But, after doing all that I could do myself, I experienced a good deal of trouble, owing to the difficulty in getting a physician to aid me who would be willing to experiment with his patient. However, after several disappointments I was enabled to try the virtue of the overlying oil through the kindness of Mr. Frank Greenawalt, then a medical student in our town, who administered the dose of oil on the 19th of June, 1887. The dose was taken at 6 o'clock A. M., the patient having taken no nourishment the previous evening other than a glass of milk, and a glass of milk in the morning. At 8 o'clock, an ounce of castor oil was given, and between the hours of 12 o'clock noon, and 4 o'clock P. M. about 15 feet of tapeworm, with the head, was passed.

This was certain evidence, that there is virtue in the oil; but now the trouble was to test the sediment, and I experienced the same difficulty as before, but finally, after waiting nearly two years, I had an opportunity to try it, through the kindness of Dr. P. Brough Montgomery, who administered the dose of sediment on the evening of February 8th, 1889, the patient having fasted during the day. The

next morning a dose of castor oil was taken, and that day 14 yards of tapeworm were passed.

This would show that both the sediment and the overlying oil possess active properties, the sediment being as active as, if not more so, than the oil, and that it could be separated from the nauseating oil and administered with the same result, as from a dose of the oil and resin. It has the additional advantage of greater convenience, as the capsules could be filled and kept in stock.

NOTE BY THE EDITOR.—Although some works of reference give the dose of filicic acid as a tænifuge, and all works direct the oleoresin of male fern to be dispensed with the sediment, references to actual experiments are rarely met with. Bernatzik and Vogl (*Arzneimittel-Lehre*, p. 7), state: "Carlbloom (1866) declared filicic acid to be the therapeutically active substance of male fern, and recommended it as a remedy for cestoda in powder form (dose 0·12 gm.); but it appears to be not the sole active principle, since Rulle (1867) found the impure filicic acid (from the ethereal extract) more active than the pure acid."

A NEW MEDIUM FOR MOUNTING STARCHES AND POLLENS.

BY A. P. BROWN, PH. G.

Having occasion to mount a variety of starches for examination under the microscope, I have been looking for a suitable medium that would best show the structure and at the same time preserve the specimen. The students of the class in microscopy at the Philadelphia College of Pharmacy are desirous of preserving the different starches that are given to them for examination during the course; but until recently I have not been able to give them, for mounting for Starches, Pollens and similar vegetable substances, a medium that would have the advantage of showing the structure of the specimen after it had been finished and preserved for future reference. Balsam of fir makes starches too transparent. Glycerin is good, but it is almost impossible to find a cement that would hold it, on account of its solvent properties. Carbolic acid and water in time dry out. Cosmolin has been recommended, but it is too greasy and it has the same fault as glycerin; it is almost impossible to find a cement that will hold it.

A short time ago Mr. Charles Bullock spoke to me of a new medium he had been using to mount vegetable tissues; it struck me

as being the very article for mounting starches in. I prepared some and found it to answer the purpose admirably; it is as follows:

Selected Gum Arabic	℥ ij.
Glycerin	
Distilled Water, of each	f ℥ iss.
Thymol	gr. i

These are all placed in a wide-mouth bottle, which is corked carefully to exclude dust, and placed in a warm situation. It takes several days to effect a perfect solution, the mixture being stirred up occasionally. When all is dissolved strain through linen, and set aside the liquid about a week longer to get rid of air bubbles and to allow any small particles that may have passed through the strainer to settle to the bottom; or it can be filtered through absorbent cotton by using a funnel for hot filtration, which consists of a double tin case holding water, kept at the required temperature by a spirit lamp placed under the projecting arm. A glass funnel fits inside of the hot water bath, a plug of absorbent cotton is placed in the funnel, and the solution is passed through it. After filtration it is best preserved in compressible tubes.

To mount starches or pollens, a clean slide is breathed on and then dusted over with the starch or pollen to be mounted; the surplus is removed by gently tapping the slide against any hard substance—a table, for instance. Enough of the starch will adhere to the slide, and will be nicely distributed over the field. A drop of the mounting medium is now placed on the slide carefully and the cover placed over it. If there are any air bubbles in the mounting medium when placed on the slide they should be carefully picked out with a mounting needle. If the medium is kept in a compressible tube there is not much danger of air bubbles on squeezing out a drop; or if there are any, they will be on the surface, and can be readily removed with a mounting needle. The slide can then be finished immediately by running a ring of any kind of cement around the edges of the cover glass, and the mount is permanent.

The medium can be colored blue by adding a small quantity of aniline blue, although it is not necessary, as the structure of the starches can be plainly seen. They should be examined by central and oblique illumination, and with the polariscope, to give the student interested in this subject an idea of the beauty of starches and pollens.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the AMERICAN JOURNAL OF PHARMACY.

HYSTERIONICA BAYLAHUEN.—Prof. Dujardin-Beaumetz received samples of this plant from Chili, where it is thought to have special action in certain gastro-intestinal troubles (especially in chronic, hemorrhagic recto-colites), indigestion, flatulent dyspepsia etc. He gave the samples to Dr. Baillé who gives the results of his studies in the *Bull. gén. de thérap.*, February 23d. A close anology was found to exist between this plant and Grindelia robusta, though Dr. B. writes that he has not been able to find the substance (analogous to saponin), cited by Mr. Henry Clark in the AM. JOURN. PHAR., Sept. 1888, and called by him grindelin. Dr. B. made a tincture of hysterionica by macerating 100 gm. of the plant in 500 gm. of strong alcohol for 10 days; dose 15 to 35 drops. Doses of 20 drops appear to have given excellent results in two cases of chronic bronchitis. The action seems to be similar to that of other balsamics but it is better tolerated. Its action was excellent in obstinate diarrhœas which had not been benefitted under opium and sub-nitrate of bismuth; also in the late and persistent diarrhœa of phthisical subjects. Dr. B. thinks it acts as "a kind of antiseptic dressing upon the intestinal surfaces." It exerted a notable amelioration in two cases of cystitis. It also gave good results as a dressing for open wounds, and in two cases of varicose ulcer. The author favors the use of an infusion of 1 part of the plant in 150 parts of water.

ERGOSTERIN.—Recent researches made by M. Tanret, seem to show that the crystallizable principle of ergot of rye, which was formerly regarded as cholesterin, differs in composition from that substance and its isomeric bodies, though the resemblance is such as to justify the name, ergosterin, which he has given to it. Ergosterin is isolated by exhausting ergot with alcohol, distilling and washing the extract with ether, and distilling the ether, the product being an oily mass filled with crystals. These are separated and recrystallized in alkaline alcohol, and then in pure alcohol. The product is about 2 to 1000. The formula is $C^{52}H^{40}O^2,H^2O^2$. The substance is insoluble in water, and soluble in alcohol, ether and chloroform; it melts at 154° C. (309° 2 F). It oxidizes slowly in the air; it is not attacked by concentrated and boiling alkaline solutions. It is, like cholesterin, a monatomic alcohol. With nitric and hydrochloric acids and iron perchloride, its reactions

are the same as those of cholesterin. But concentrated sulphuric acid colors the latter brown, and makes an incomplete solution, which, agitated with chloroform, gives an orange yellow color passing to red, and then to violet. Concentrated sulphuric acid completely dissolves ergosterin however, and when the solution is agitated with chloroform the latter remains colorless, though, on evaporation, a faint violet coloration appears if a notable quantity of ergosterin be used. *Comptes rendus de l'Acad. des Sci.*, Jan. 14, 1889; *Répert. de phar.*, Feb. 10.

Oleandrine and Nereine.—In a recent article (*Nouv. rem.*, Feb. 8), on the comparative value of the extracts and the alkaloids of plants, Dr. Bardet writes thus: "I am surprised that Prof. Sée should consider as settled the question of the similarity of oleandrine to digitalein, and of nereine to digitalin. I do not know if M. Sée has ever possessed these substances, but I have sought for them in the market for a year without being able to procure them. I have, with M. Adrian, tried to get a defined active principle from oleander, but we have not succeeded in getting more than a very active extract. In fact, oleandrine and nereine have no practical existence. Like many of the alkaloids, they are purely scientific products, found once, and sometimes sought for afterwards in vain. Druggists will perhaps dispense a substance obtained by an indicated process for oleandrine, but it will be no more than an unknown residuum."

Toxic Power of Digitalis.—At a meeting of the *Société de Biologie*, M. Roger said: "The toxicity of digitalis diminishes very notably when the product of maceration is concentrated by the water-bath. Thus, a 5 per cent. maceration, which is toxic in doses of 2 cgm., no longer kills save in doses of 1·8 gm., when it is concentrated by 4 per cent. If reduced by 6·6 per cent., 3 gm. would be required to produce the same toxic effect.—*Nouv. rem.*, Feb. 24.

A Dangerous Chlorate of Potassium Prescription.—A pharmacist writes to the *Bull. com.*, Jan., stating that he often gets a prescription as follows: Chlorate of potassium, 5 gm.; dist. water, 120 gm.; simple syrup, 30 gm.; a dessert spoonful every half hour. "Children who take this," adds the pharmacist, "*always die.*" M. Brouardel cites six cases of death in children after using a similar potion. Can I refuse to dispense this mixture?" The editor says the pharmacist cannot refuse; he can only state the facts to the doctor, "who will be likely to attribute the cause of death to the gravity of

the disease." He adds: "Physicians, on account of the scant information we have as to the physiological action of chlorate of potassium, use this medicament with the same imprudence and the same indifference as they have formerly shown."

PROF. BALL'S PURGATIVE PILLS.—The *Répert. de Phar.*, Feb. 10, gives, by permission, the formula of a pill which appears to have become popular with Parisian prescribers. It is as follows: Aloes (soc.), 1 gm.; res. scammony and jalap of each, 50 cgm.; calomel, 50 cgm.; ext. belladonna and hyoscyamus of each, 25 cgm.; medicinal soap, q. s. (about 2 gm.). Make 50 pills. Dose, 3 to 5 daily.

PETROLATUM CERATE.—M. Nicot (*Bull. gén. de Thérap.*, Feb. 15), praises this composition, which he describes as being "a very unctuous and homogeneous preparation of immaculate whiteness." He adds that petrolatum, which is a good excipient in most ointments, need not be thought out of place for cerate. His formula is: White petrolatum, 500 gm.; oil of sweet almonds, 50 gm.; white wax, 50 gm. Melt with gentle heat and mix in a warm mortar, adding slowly, 50 gm. of rose-water. For *cold cream* the white wax should be replaced with spermaceti.

DETECTION OF ACETONE IN URINE.—Add to the urine a few drops of a concentrated solution of nitro-prussiate of soda, and make the solution alkaline by adding potash. A red coloration appears and then goes off; add acetic acid, and, if acetone be present, we get a dark violet color. To find diacetic acid, perchloride of iron is used; it gives a dark red color. Urine containing thalline, antipyrine and salicylic or phenic acid gives the same reaction with perchloride of iron, but with diacetic acid the color disappears on boiling. If urine be boiled before adding the perchloride of iron, the reaction does not take place in the case of diacetic acid, but occurs as usual with the other substances. Urine should be subjected to analysis as soon as possible, lest the diacetic acid decompose into acetone and carbonic acid.—*Bull. de la Soc. de Phar. de Bordeaux; Nouv. rem.*, Feb. 24.

Preparation of Iodoform.—Fifty parts of potassium iodide, six parts of acetone and two parts of sodium hydroxide are dissolved in one or two litres of cold water. Into this mixture there is poured, drop by drop, with constant stirring, a dilute solution of sodium hypochlorite. Iodoform is quickly produced and precipitated. Further addition of hypochlorite is made until the acetone or all of the iodine has disappeared.—H. Sulliot and H. Raynaud, in *Bulletin de la Société Chimique de Paris*, Vol. 2, No. 1.—C. B.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Mœrk, Ph. G.

Creolin.—Th. Weyl, in *Ber. d. D. Chem. Ges.*, 1889, 138, gives analyses ot the two brands found in the market at the present time; it will be seen that they only have the name in common. Pearson's article is quite soluble in ether which is a simple distinctive test.

	Pearson's.	Artmann's.
Hydrocarbons	56·9	84·9
Phenols	22·6	3·4
Acids	0·4	1·5
Sodium	2·4	0·8

Meconarceine and Meconate of Narceine.—A French preparation under the former name, according to E. Merck, appears as a neutral yellow solution, odor of camphor, containing 0·5 per cent. alkaloid, composed chiefly of codeine, with some narceine, combined with an ether-soluble acid. A German firm has introduced a white powder sold indiscriminately under the above names, which is a mechanical mixture of narceine and meconic acid, melting at 110°; in dissolving this powder a chemical reaction takes place and the recrystallized product melts at 126°. Pure meconate of narceine was obtained by uniting equal molecules of narceine and meconic acid; it is of a lemon-yellow color, soluble in boiling water, the solution possessing an acid reaction; difficultly soluble in alcohol, the best solvent is 50 per cent. alcohol; melts at 126°.—*Pharm. Ztg.*, 1889, 90.

Picrotoxin is recommended by Prof. Bokai as the most rational antidote for morphine, it having been experimentally demonstrated to possess properties directly antagonistic to those of morphine.—*Apoth. Ztg.*, 1889, 139.

Dammar contains, according to researches of B. Graf: 1 per cent. of a dibasic acid, formula $C_{18}H_{33}O_3$; 40 per cent. insoluble in alcohol, which is not a hydrocarbon as has been announced, but which still contains some 2 per cent. oxygen, melts at 140°–145°; and about 60 per cent. soluble in alcohol of formula $C_{20}H_{42}O_2$, containing one alcoholic hydroxyl group, does not possess acid properties, melts at 61°. —*Arch. der Pharm.*, 1889, 97.

Tests for Creasote:—1. Specific gravity 1·070–1·080 (xylenol and phlorol have specific gravity 1·036, guaiacol 1·117, creasol 1·089); 2. the presence of guaiacol and creasol, indicated by formation of potassium salts insoluble in alcohol, is ascertained approximately quanti-

tatively by thoroughly shaking 1 cc. creasote and 10 cc. of a solution containing 50 gms. potassium hydrate dissolved in 200 cc. 96 per cent. alcohol; the test after a short time should yield a solid mass not disturbed by brisk agitation; 3. 4 cc. water, 4 cc. sodium hydrate solution and 2 cc. creasote should produce a perfectly clear light-yellow solution, a turbidity indicating indifferent oils, a darkening other constituents of the wood-tar; 4. the glycerin test for carbolic acid.—W. Brandes, *Arch. der Pharm.*, 1889, 111.

An insect powder with the suggestive addition "fortior," containing 10 per cent. powdered quillaia is *claimed* to be superior to the pure powder, but Caesar and Loretz proved experimentally the inertness of pure powdered quillaia as an insecticide, hence, also the inferiority of this stronger insect powder.—*Rdsch.*, 1889, 146.

Freezing mixtures containing crystallized carbon dioxide. At ordinary pressure this substance lowers the temperature to —60°, in vacuo to —76°; with ether, normal pressure, to —77°, in vacuo to —103°. By dissolving in methyl chloride —82° is reached, in sulphuric anhydride —82°, in amyl acetate —78°, in chloroform —77°, in alcohol —72°, in ethylene chloride —60° and in methylene chloride as low as —106° C.—Cailletet and Colardeau (Compt. rend.) *Oester. Ztsch. f. Pharm.*, 1889, 82.

Potassium sulphocyanate frequently is contaminated with small quantities of ferrous salts which cause the crystals on exposure to assume a red color. To purify such specimens J. Kranzfeld dissolves in dilute alcohol and adds ammonium sulphide; the ferrous sulphide is removed by filtration, the filtrate concentrated and allowed to crystallize over sulphuric acid.—*Pharm. Ztschr. f. Russl.*, 1889, 68.

Salicylic acid may be distinguished from carbolic acid and resorcin by adding to an aqueous solution a few drops of a ferric solution and then lactic acid; the addition of a single drop of this last reagent changes the violet color, due to carbolic acid and resorcin, to a yellowish-green, while that due to salicylic acid is not affected until more than ten drops have been added.—L. v. Itallie, *Apoth. Ztg.*, 1889, 100.

Podophyllin, the active principle of which is podophyllotoxin, may be assayed by extracting 1 gram with cold chloroform, evaporating the greater portion of the solvent and pouring the solution into twenty volumes of petroleum ether; the podophyllotoxin is collected upon a tared filter, dried and weighed. Commercial samples of podophyllin

yield from 20 to 30 per cent. podophyllotoxin.—A. Kremel, *Pharm. Post*, 1889, 105.

Bor-ice, a patented artificial ice is made by freezing a solution of boric acid or borax. After the melting of the ice the antiseptic addition becomes active and lengthens the time of preservation.—*Rdsch.*, 1889, 174.

Cherry-gum and glue as substitutes for gum arabic in making emulsions have been experimented with by F. Stokowetzki who finds that cherry-gum used in the proportion of 1 part gum to 2 parts oil makes a very thick emulsion; in the proportion 1 to 8 a watery emulsion results and, hence, easily separates; the proportion 1 to 4 gives the consistence of a good emulsion; the partial solubility of the gum gives the emulsions an unelegant appearance due to the presence of the suspended particles of bassorin; but by pouring through a fine sieve the coarse particles are removed and a more attractive preparation results. The addition of sodium bicarbonate to such an emulsion causes an immediate separation with formation of a brown color. Glue gives emulsions in the proportion 1 to 2 of excellent appearance, not to be distinguished from those made with acacia and not affected by sodium bicarbonate. The odor of the glue is masked but not so the taste; while it is probable that the taste of the glue by careful preparation may be remedied, it is doubtful if the substitute should be used, especially for persons having digestive troubles.—*Pharm. Ztschr. f. Russl.*, 1889, 84.

Sealing-wax, indifferent to alcohol.—5 parts beeswax, and 1 part each carnauba-wax and paraffin are melted together and heated with 5 parts red-lead and 2 parts prepared chalk, with constant stirring, until the mixture becomes thick.—*German patent, Rdsch.*, 1889, 176.

Sulfonal.—The preparation of this chemical involved the formation of ethyl-mercaptan (of such disagreeable odor that factories had to be erected distant from inhabitation) by distillation of ethyl-sulphuric acid and potassium sulphhydrate, condensing this with acetone to form mercaptol which on oxidation with potassium permanganate yields sulfonal. A recent patent granted to the Farben-fabriken (formerly Fr. Bayer & Co.) allows of the manufacture without the isolation of mercaptan; ethyl chloride or bromide acting upon sodium thiosulphate forms sodium ethyl thiosulphate which when treated with HCl by addition of H_2O splits into ethyl mercaptan and acid sodium sulphate;

the ethyl mercaptan in the nascent state and presence of HCl condenses with acetone to form mercaptol (yield about 70 per cent.) which by dilution with water is separated, then removed and oxidized by $K_2Mn_2O_8$.—*Pharm. Ztg.*, 1889, 98.

Genuine raspberry syrup can be distinguished from manufactured preparations by treating, 1., 2cc. of the syrup with 4cc. dilute hydrochloric acid and a few fragments of zinc. It becomes colorless after a few hours, but genuine syrup by agitation and exposure to the air reassumes the original color, while imitations will not; 2., after decolorizing by use of sodium sulphite and adding nitric acid, if genuine, the red color reappears.—H. W. Bettink, *Pharm. Ztg.*, 1889, 99.

Arsenic in glycerin.—E. Ritsert in examining commercial glycerin finds all specimens to contain arsenic if examined by Gutzeits' test (Am. Jour. Phar. 1889, 133). After testing the reagents the procedure is to place 1cc. glycerin, 1cc. water, 15 drops hydrochloric acid and 0.6 zinc in a long test tube and allow the gas to act upon filter paper moistened with a strong solution of silver nitrate. The reaction was not due to H_2S or H_3P as the addition of iodine solution did not prevent the reaction. The presence of the arsenic is traceable to the sulphuric acid used in decomposing the fat. Ammoniacal silver solution is a good test for arsenic (Am. Journ. Pharm. 1889, 23), dependent upon the quantity present there is produced a mirror, gray deposit or an opalescence.—*Pharm. Ztg.*, 1889, 104.

Capsaicin according to A. Meyer is present exclusively in the placenta of Capsicum annum, the other portions of the fruit being entirely free from it. The placenta of 5000 gm. red pepper weighed 110 gm. which contained 0.9 per cent. capsaicin or for the whole fruit 0.02 per cent. The isolation was effected by extracting with boiling ether, evaporating, mixing with oil of sweet almonds (to retain the red coloring matter), extracting with 70 per. cent. alcohol, evaporating, dissolving in solution of potassium hydrate free from carbonate, filtering and passing into the filtrate CO_2 to saturation; after standing some days the capsaicin crystallizes out and is purified by washing with water and cold benzin.—*Pharm. Ztg.*, 1889, 130.

Thymol gives the following reaction, not obtained with other phenols. A few drops of potassium hydrate solution added to a solution containing thymol, followed by sufficient iodine dissolved in potassium iodide to impart a faint brown color, on moderate heating, develops a red color, gradually becoming more intense. 0.00005 gm. in 1cc.

water can be detected by this test.—L. v. Itallie, *Apoth. Ztg.*, 1889, 197.

Salicylate of zinc is made rapidly and cheaply by boiling for several minutes 34 parts sodium salicylate, 29 parts zinc sulphate and 125 parts water; after cooling the mass of crystals is collected on a filter, washed several times with small portions of water and finally, recrystallized from boiling water. The salt has the formula $Zn(C_7H_5O_3)_2$ $2\ H_2O$; 1 part dissolves in 25.2 parts water and in 3.5 parts alcohol; the anhydrous salt dissolves in 36 parts ether and 450 parts chloroform. For external use it can be applied as a fine powder or salve, also as a solution in collodium.—L. v. Itallie, *Pharm. Ztg.*, 1889, 131.

Color reactions of some volatile oils.—Oil of peppermint dissolved in alcohol after addition of a little finely powdered sugar gives on heating with HCl or dilute H_2SO_4 an intense blue-green color. Menthol does not give this reaction. *Oils of cloves, cassia and pimenta* with an alcoholic phloroglucin solution and HCl give intense red colors; with resorcin in the same way oil of cloves yields a red violet color, oil of cassia a vermilion red color, oil of pimenta a dirty violet color. —A. Ihl, *Chem. Ztg.*, 1889, 264.

Quantitative separation of brucine and strychnine.—The difference in behavior towards oxidizing agents allowed J. E. Gerock to formulate a method by which these two alkaloids could be estimated; it is dependent upon the decomposition of brucine by means of dilute nitric acid, the products of decomposition not possessing alkaloidal properties. The picrates of the alkaloids acting like the latter, from neutral solution at the temperature of the water-bath the alkaloidal solution is precipitated by picric acid, after standing for a short time the precipitate is collected upon a weighed filter, washed with cold water until the washings are colorless, dried at 105° and weighed. The precipitate is transferred, as completely as possible, to a beaker and nitric acid sp. gr. 1·056, warmed on a water-bath, is repeatedly passed through the filter to decompose any unremoved brucine picrate; the nitric acid is then added to the precipitate in the beaker and this placed on a water-bath for some time; by carefully neutralizing, adding a trace of acetic acid and allowing to cool, the strychnine picrate is reprecipitated, collected on the previously used filter, washed, dried and weighed. The difference between the two weighings represents the brucine picrate (anhydrous). Control experiments agree very well.—*Arch. der Pharm.*, 1889, 158.

ON SOME NEW TESTS FOR TANNIC AND GALLIC ACIDS.

By S. G. Rawson, B. Sc.

The ordinary reagents which are used in detecting these acids are ferric chloride, which gives its well-known reaction with both, and a solution of gelatin which reacts only with tannic acid. In the case, however, of a dilute solution of tannic acid no precipitate is obtained with gelatin; and hence considerable difficulty arises in distinguishing between the two acids. Young's test for these acids, *viz.*, potassic cyanide, I found to work well, giving a reddish color with gallic acid and none with tannic acid.

If a solution of tannic acid be treated with ammonium chloride alone a precipitate falls, but only with extreme slowness; whereas on the addition of ammonia a beautiful white precipitate instantly appears, but this, probably by oxidation, becomes rapidly of a reddish brown color. With gallic acid no precipitate falls in either a strong or a weak solution, but the liquid becomes of a red color. In a solution of tannic acid containing one part of tannic acid in 5000 of water a precipitate falls, but slowly, and with more dilute solutions, therefore, it is better to drop the mixture of ammonic hydrate and chloride very cautiously on to the top of the tannic acid solution. Where the two liquids come in contact with one another the white precipitate makes its appearance at once in a well-marked line. This white line is distinctly visible in a solution of tannic acid containing 1 part in 20,000 of water. If, however, a piece of black paper be held behind the tube the delicacy of the test is increased and 1 part in 50,000 parts of water may be now detected. There is no advantage in substituting other ammonium salts such as the phosphate, carbonate or oxalate for ammonium chloride.

With gallic acid, as previously mentioned, no precipitate is formed; but a ring, usually of a greenish color on its lower surface, is produced, this being recognizable in solutions containing 1 part of gallic acid in 100,000 of water.

Some few experiments were tried, in the case of tannic acid, with a view to using the method as a quantitative one; but owing to the unstable nature of the precipitate in alkaline solution, this attempt was, as I anticipated, a failure.

Another delicate test for both gallic and tannic acids is to add to

the solution containing one of them chlorine water and then ammonia, a beautiful red color being at once produced. With tannic acid the color is very well marked and distinct, but is not quite so noticeable with gallic acid, for with this acid, as is known, ammonia alone gives a red color. With a mixture of potassic ferri-cyanide and ammonia both acids also give a dark red colored solution. In the case of tannic acid 1 part in 10,000 of water gives a distinct red color to the whole of the solution. In a weaker solution, say 1 part in 30,000 of water, the red color is best seen by looking down the test-tube through the whole column of the liquid. In still more dilute solutions, containing only 1 part tannic acid in 100,000 of water, it is better to compare the tint, which is now more of a yellowish brown, with the tint of a blank experiment, *i. e.*, one containing the same amount of ammonia and of potassic ferricyanide in the same volume of water, but with no tannic acid present. Under these conditions the change in color will be perfectly apparent, and the delicacy or the reaction may be carried considerably further. The red coloring matter can be salted out, and I am at present engaged on some further investigations into its composition and properties.—*Chemical News*, Feb. 1, p. 52.

University College, Liverpool.

NOTE ON GLYCERINUM ACIDI GALLICI.

By G. Melvin.

A short time ago I had occasion to dispense the following mixture:—

℞	Glycerin. acid. gallic	℥i.
	Acid. sulph. dil	℥ii.
	Ext. ergotæ liq	℥ss.
	Aq. cinnamomi	ad ℥viii

Misce.

It was sent out a perfectly bright mixture, but was returned a few hours afterwards with a message that some mistake must have been made. The gallic acid had separated in bundles of large acicular crystals. It was stated that the mixture had been previously dispensed at different pharmacies and had never shown the same separation of crystals before. The mixture was again dispensed with a precisely similar result, and to obviate the difficulty an additional half ounce of glycerin was added to it and sufficed to keep the acid in

solution. The glycerin. acid. gallic. used had been very recently prepared and was of a very faintly brownish tint.

I obtained samples of glycerin. acid. gallic. from different pharmacies and treated them as follows:—To 4 drachms of each sample I added 4 ounces of distilled water, and exposed the mixture to a temperature of 32° F. Even after the lapse of two or three hours no crystallization had taken place. Repeating the experiment with various samples of glycerin. acid. gallic. which I had recently prepared from different samples of gallic acid, crystallization began almost immediately. All these samples were made with only just sufficient heat to dissolve the gallic acid by placing them in a water-bath. A portion of a freshly prepared sample of glycerin. acid. gallic. was heated to 340° F. for about 5 minutes. Bubbles of carbon dioxide were given off, and the gallic acid was evidently changing into pyrogallol. On using this overheated sample to make the mixture there was only a very slight separation of crystals even after exposure to a temperature of 20° F. This I account for by the partial change of the gallic acid into pyrogallol, which is freely soluble in water. I think it is probable that a change similar to that produced by overheating takes place in this preparation after long keeping, and that this accounts for the fact that separation of crystals only took place when freshly prepared samples were used. It is, of course, possible that too great heat was used in making some of the commercial samples I obtained.

I observe Squire states that in the case of glycerin. acid. gallic. part of the acid separates on cooling and remains undissolved. This, however, I cannot confirm. I have prepared various samples from different acids, and glycerin of B. P. specific gravity, using as low a heat as possible to effect solution, and even at a temperature below freezing no separation took place. It is, however, a saturated solution, and if made stronger the acid is sure to crystallize.—*Phar. Jour. and Trans.*, March 16, p. 755.

Lactic Acid in Diarrhœa.—Sézary and Aune (*Lyon Méd.*) have successfully used lactic acid against the diarrhœa of tuberculous patients, the stools be coming natural in a few days. They commenced with 2 gm. in a glassful of water, given frequently in small doses during 24 hours; if necessary the quantity is increased to 6 or 8 gm. a day, and a little chlorodyne may be added.

NOTES ON CASCARA SAGRADA.[1]

By H. D. Fuge.

The characters of the dried bark as described in the British Pharmacopœia are fairly characteristic, and enable it to be readily distinguished from the various substitutes which have of late tended to manifest themselves on the market; but since a recent bark possesses properties which have a tendency to produce vomiting and epigastric pain, it would seem advisable to add to the official directions that the bark should be kept for a definite period before being employed for purposes of pharmacy.

A curious fact may be mentioned in connection with the nomenclature of cascara sagrada and its preparations. The extracts are officially (in *Brit. Ph.*) described as extractum cascaræ sagradæ and extractum cascaræ sagradæ liquidum. No mention of the drug occurs, however, in what from popular use might be termed its natural position, *i. e.*, as cascara sagrada (the English and Latin terms being identical), but one has to turn to Rhamni Purshiani Cortex, there to find that the title cascara sagrada is given merely as a synonym; apparently the same element of uncertainty was present in arranging the position of the drug, as appears in the selection of menstrua for its exhaustion.

I. *Extractum Cascaræ Sagradæ.*—This is directed to be prepared by exhausting the bark in No. 40 powder with proof spirit, by a process of maceration and percolation, with subsequent evaporation of the percolate until of a suitable consistence.

The official sanction might well be given to the recovery of the greater part of the spirit by distillation.

Pills made with this extract have the disadvantage of "falling," which can only be remedied, so far as I am aware, by varnishing them.

II. *Extractum Cascaræ Liquidum.*—This is prepared by the repeated boiling of 16 ounces of the bark with distilled water until exhausted; the strained liquor so obtained being evaporated to 12 fluid ounces, 4 fluid ounces of rectified spirit added when cool, and the product filtered and made up to 16 fluid ounces by the addition of distilled water. The process of filtration requires considerable patience even on the small scale.

The solvents ordered in the preparation of these extracts differ, the

[1] Read before the School of Pharmacy Students' Association; reprinted from *Phar. Jour. and Transact.*, March 9th, p. 736.

one being spirituous the other aqueous. As doubts have been expressed as to the efficiency of water in effecting solution of the principles of cascara, I decided to try whether the bark was thoroughly exhausted in the preparation of the official liquid extract.

A weighed quantity of the bark was treated as described in the Pharmacopœia until the last liquor was free from color and taste; the residual cascara was dried, then macerated and percolated with spirit. Upon evaporating the percolate a considerable amount of extractive matter remained, which upon being tested physiologically was found to possess the characteristic laxative properties of the drug.

With a view of finding a process for completely extracting the bark a number of formulæ were tried; the following has produced the best preparation in my hands[1]:—

Cascara sagrada in No. 40 powder	20 ounces.
Rectified spirit, Distilled water	of each a sufficiency.

Mix together equal quantities of the spirit and water. With this menstruum moisten the bark, pack tightly in a percolator, pour on more of the liquid and allow it to macerate for forty-eight hours; then proceed to percolate, adding more of the menstruum as necessary, until exhaustion is complete; reserve the first fifteen fluid ounces; evaporate the remainder to the consistence of soft extract and dissolve in the reserved portion; finally make up to 20 fluid ounces by the further addition of the diluted spirit.

The chief objections to the employment of cascara sagrada is its unpleasant and intense bitterness. Two methods are employed to get over this difficulty:—

I. The addition of some agent calculated to mask the bitter taste of the liquid extract.

In the Conference Formulary we have two examples of this kind, viz., syrupus cascaræ sagradæ (1 part of liquid extract in 5), and elixir cascaræ sagradæ (2 parts liquid extract in 5); the latter deposits largely on keeping.

A preparation which does not precipitate on dilution, and, in my opinion, is less nauseous than the above, may be made by mixing equal proportions of the liquid extracts of cascara sagrada and liquorice, a few minims of spirit of chloroform being added to each dose.

III. *Tasteless Extracts*—The suggestion that an extract of cascara

[1] The National Formulary directs diluted alcohol as the menstruum.

sagrada devoid of bitterness might be prepared by the indirect agency of magnesia was due to Grazer of San Francisco (*vide Pharm. Journ.*, vol. xv., p. 745).

(1) An extract prepared as directed by him was found to possess very little medicinal value.

(2) An extract prepared by adding magnesia to the powdered bark and proceeding as in the official liquid extract likewise gave very poor results.

(3) The modified formula as given by Mr. Wright at the meeting of the Conference was next tried.[1] This, I consider, yields a much better preparation both pharmaceutically and medicinally; doses about twice as large as are indicated in the case of the official liquid extract should be employed.

(4) An equally good preparation may be made in a less complicated manner by adding magnesia to a spirituous percolate of the bark, the excess being subsequently filtered out before evaporation is completed.

As a result of a number of physiological experiments, made with "tasteless extracts," prepared in accordance with most of the published formulæ, the following conclusion has been arrived at: "That although they possess some degree of medicinal activity, they in no case possess the full physiological value of the ordinary liquid extracts."

The precise nature of the action of the magnesia I have as yet been unable to ascertain. Upon evaporating a portion of the extract to dryness and incinerating, a considerable amount of magnesium oxide was left behind; from this it might be expected that the bitterness would be again developed on acidifying the extract. This, however, is not the case; nor does the residual magnesia separated during the preparation of a tasteless extract as above described become bitter on treating with a slight excess of dilute acid.

It is stated in the important paper on cascara sagrada by Meier and Webber (AMER. JOUR. PHAR., 1888, page 87), that the resins contained in the bark are not bitter; the fact that the resinous matter precipitated by the addition of acid to a tasteless extract is not bitter would point to this conclusion.

I have not, however, succeeded in obtaining a product free from bitterness by repeated precipitation of the resin from a strong alcoholic solution with water.

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[1] Mix cascara sagrada, powder No. 40, 1 pound, magnesia, 2 ounces, and water, 1½ pints; macerate for 12 hours, dry, powder and with proof spirit prepare 16 fluidounces of fluid extract.

NOTES ON EGYPTIAN OPIUM AND SOME OTHER DRUGS OF THE CAIRO BAZAARS.[1]

By William Martindale.

During a recent visit to Egypt I was much interested, as everyone is who visits the place, by the picturesque appearance of the Cairo Bazaars, and, having made inquiry at a wholesale drug house, regarding the cultivation of Egyptian opium, Signor Bossi, the manager, kindly went with me through the native drug bazaar, and acted as an interpreter.

He said that opium was collected, and the poppy cultivated for its production, at Akmim (the ancient Panopolis), on the right bank of the Nile, about 320 miles above Cairo, and a little of inferior quality at Assiout (or Siout, the ancient Lycopolis) on the left bank, about 250 miles up. It was offered to them at times, but was not dealt in by his house, because it was so much inferior to Smyrna opium. It is used by the natives, and is sold in the bazaars to which he accompanied me.

The piece of Akmim opium which I bought is a hard flat cake, about four inches in diameter by one inch in thickness. It has the mark of a leaf adhering to it, and is rough and irregular in appearance.

The Assiout opium is in segments of a cake, much softer than the other and is very inferior and adulterated in quality. Mr. Salter has examined some of each, and finds the crude samples to contain as follows:—

Akmim opium, 7·24 per cent. of morphine.
Assiout " 0·6 " " " "

Owing to my limited time, and not having booked a passage beforehand, I was unable to proceed any distance up the Nile, else I should have visited Assiout, the terminus of the railway, at which passengers join the Nile steamers for the quick trips up to Luxor and Assouan. Akmim is nearly opposite to Sohag, one of the landing stations of the boats, about seventy miles above Assiout.

I exhibit two specimens of the Egyptian poppy capsules, showing the incisions from which opium has been obtained. I saw poppy heads, on stalks, tied in bundles of about a dozen, exposed for sale.

[1] Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, Wednesday, March 13; reprinted from Phar. Jour. and Trans., March 16, p. 743.

These were not incised, but had been freed from seeds, which are used separately as food.

Soap root is much used for cleaning silks and other fabrics. It is not collected in Egypt, but is principally imported from Syria, where, I was informed by Said Gawadd, a Syrian pharmacist, it grows abundantly. There appears to be more than one kind of it in use. One is said to be obtained from *Gypsophila Struthium*, and to contain saponin, but Mr. Holmes thinks, from the appearance of the starch, that the sample of root which I exhibit, is obtained from some leguminous plant. It is very mucilaginous, but appears to contain little saponin.

I noticed in one part of the bazaar, a row of deep narrow granite mortars fixed in front of the shop, and on one occasion two Arabs were powdering some soap root, with iron pestles a little more pointed than those in use with us, pounding alternately in the same mortar, like a couple of blacksmiths. An array of primitive sieves was seen in the interior.

I exhibit some roots, one end of which is made fibrous, to serve the purpose of a toothbrush. These are the roots of *Capparis Sodada*. They are used like the Jamaica chewsticks. They have a slightly salt and agreeable flavor.

I noticed that styrax bark, from *Liquidambar orientale*, was frequently exposed for sale; it is in small agglomerated pieces of a reddish-brown color, and is mentioned by Hanbury under the name of *Cortex Thymiamatis*. It has an agreeable odor, and is used for burning as a perfume. It is from this bark that the liquid styrax has been pressed.

From a dealer in perfumes I bought some incense sticks, which are about 4 to 6 inches in length and three-eights of an inch in diameter. The burning material is rolled around a fine wooden spill, like the wick of a candle. Their composition is similar to that of our fumigating pastilles, and apparently includes styrax and cascarilla barks. I also obtained from him some perfume tablets for burning, which he much prized. They are gilded, and contain much resin, probably mastiche, frankincense and styrax. He also supplied me with a little mastiche for burning, some cascarilla bark, and a resinous substance which he valued highly, it having been brought from Mecca. This, on comparison with a specimen in the Museum, proves to be Palembang benzoin.

The pods of *Acacia arabica*, of which I obtained a small specimen, contain a quantity of astringent matter, and are used for dyeing, striking a black color with iron.

Henna, the powdered leaves of a species of *Lawsonia*, is also largely exposed for sale, and the stained finger-nails of many of the women and children give evidence of its use.

The fruits of *Zygophyllum coccineum*, which have an aromatic odor and a bitterish acrid taste, are used, I was informed, as a remedy for ophthalmia, which, in various forms, is very prevalent among the natives. They are said to have been used by the old Arabian physicians, and Mr. Holmes finds that the leaves of *Zygophyllum simplex*, which has much smaller fruits, are also used by the Arabs in eye diseases.

I also show some large pods of *Albizzia Lebbek*. This is commonly known as an acacia, and is much cultivated about Cairo and Ismailia. If its roots have access to any moisture from irrigated soil, it grows to the height of 40 or 50 feet. It thrives in a climate where no rain falls, and where few other trees, except palms, grow to any height. There is an avenue of these trees all the way from Cairo to the Pyramids of Ghizeh, a distance of about 8 miles. This tree is said by Martius to yield a gum allied to gum senegal, but I did not see such an exudation on any of the trees I examined.

The seeds of *Arachis hypogæa*, known as *Pistache de terre*, ground nuts, beans of Soudan (*Soudani "foule"*), are hawked about most of the streets of Cairo, and are considered to possess aphrodisiac properties.

Signor Bossi informed me that little or no senna now passes through Cairo. It finds its way into European commerce principally through Tripoli, and the same remark applies itself to gum arabic, which finds its way principally from the Red Sea ports to Trieste.

In conclusion, I may mention that there appear to be no restrictions on the practice of pharmacy in Egypt. There is no pharmacist holding the English qualification in business in Cairo, but there are pharmacies in the hands of French, Germans, Greeks and Syrians, at most of which English is spoken.

10, *New Cavendish Street, W.*

Rhus aromatica has been found useful in incontinence of urine in children as well as in old people. Dr. Max employed the tincture of the bark, of which he gave from 20 to 50 drops daily.—*L' Union Méd.*

THE ALKALOIDS OF THE ARECA NUT AND THE PHYSIOLOGICAL ACTION OF ARECOLINE.

The "areca nut" or "betel-nut," the seed of the areca palm (*Areca Catechu*), originally indigenous in the Sunda Islands, but now cultivated extensively in the warmer parts of India as well as in the Philippines, has become there an important commercial article. In the east, as is known, it is used as a masticatory together with lime and leaves of the betel pepper, and according to von Bibra the betel chewers number 100,000,000. The areca nut is also occasionally used in China and India as a vermifuge, and successful results in this respect have procured its introduction into the materia medica of European countries, it being sometimes used in Germany, for instance, as a remedy against tapeworm.

Up to the present it has not been known to which of the constituents the areca nut owes its extensive use among the Malays as an article of food, or upon which constituent its action as a vermifuge depends. The nut contains about 15 per cent. of tannin substance, 14 per cent. of fat coloring matter, etc.,[1] and, in addition, according to Bombelon,[2] it contains a liquid volatile alkaloid, the properties and composition of which, however, he had not described. As it seemed probable that the physiologically active constituent was to be looked for in this alkaloid, Mr. E. Jahns was induced to investigate the subject more closely, and has reported the results recently to the German Chemical Society.[3]

In the preparation of the areca bases two methods were adopted, which gave equally good results. According to one the powdered seeds were exhausted three times with cold water, to which strong sulphuric acid had been added in the proportion of two grams to each kilogram of the seeds; the pressed and filtered extracts were evaporated to about the weight of the raw material used, and after cooling and again filtering precipitated with potassium-bismuth iodide and sulphuric acid. An excess of the precipitant had to be avoided, since it exercises a solvent action on the separated double salt. The red crystalline precipitate was after some days filtered out, washed and decomposed by boiling with barium carbonate and water; the alkaloids went completely into solution, whilst bismuth oxyiodide, color-

[1] 'Pharmacographia,' 2nd. edit., p. 670.
[2] *Pharm. Journ.*, [3], xvi., 838.
[3] *Berichte*, xxi., 3404.

ing matter, etc., remained undissolved. After filtration the alkaloidal solution was evaporated to a small volume, treated with sufficient caustic baryta, and shaken repeatedly with ether, which removed a base that has been named "arecoline," on account of its oil-like character. The residual liquid, which beside alkaloidal hydriodides, contained some barium iodide, was neutralized with sulphuric acid, and the alkaloids were set free by treatment successively with silver sulphate, caustic baryta and carbonic acid. The solution of the pure alkaloids was evaporated to dryness and the residue exhausted with cold absolute alcohol (or chloroform). "Arecaine" remained undissolved, whilst a third alkaloid, together with coloring matter, etc., went into solution, and upon evaporation of the alcohol remained as an amorphous mass.

According to the second method the powdered areca nuts were exhausted cold with milk of lime, the filtered extracts neutralized with sulphuric acid and evaporated to a syrupy consistence. By dissolving in a little water and filtering, the gypsum and separated coloring matter were removed; the solution was then again concentrated, made alkaline, and the arecoline shaken out with ether. The other bases were then precipitated as before with potassium-bismuth iodide and sulphuric acid.

The yield of arecoline amounted to 0·07—or at most 0·1—per cent.; that of arecaine to 0·1 per cent. Only a very small quantity of the third alkaloid was obtained.

Arecoline ($C_8H_{13}NO_2$).—The arecoline was withdrawn from the ether solution obtained as described by shaking it with acidulated water, the neutralized liquid evaporated to a small volume and after adding sufficient potash solution again shaken out with ether. The base left upon evaporation of this solution was neutralized with hydrobromic acid, and the dried salt perfectly purified by repeated recrystallization from absolute alcohol. From this purified compound the free base and other salts of it were prepared.

Arecoline forms a colorless oily liquid of strongly alkaline reaction, which is soluble in all proportions in water, alcohol, ether and chloroform. It is volatile and can be distilled, the boiling point appearing to be about 220° C., though this could not be determined with certainty, on account of insufficiency of material. The salts are easily soluble, some of them deliquescent, but mostly crystallizable. It gives with potassium-bismuth iodide a pomegranate red precipitate,

consisting of microscopic crystals (a delicate reaction), and with phosphomolybdic acid a white precipitate. Potassium-mercury iodide throws down from solutions not too dilute yellow oily drops, which after several days solidify and crystallize; solution of iodine throws down brown drops, and picric acid, a resinous precipitate that afterwards crystallizes in needles. Gold chloride also throws down oily drops, which, however, do not solidify. Platinic chloride, mercuric chloride, and tannic acid give no precipitate.

Arecoline hydrobromide ($C_8H_{13}NO_2 \cdot HBr$) crystallizes best of the simple salts. It is readily soluble in water, and in hot—but less freely in cold—alcohol; from an alcoholic solution it crystallizes in fine anhydrous prisms. The salt is permanent in air, not hygroscopic, and melts at 167° to 168° C.

Arecoline hydrochlorate crystallizes from a syrupy solution in fine needles, which deliquesce upon exposure to air. It is freely soluble in alcohol, as well as in ether-alcohol. It behaves similarly to sulphate, acetate, and nitrate.

Arecoline platinochloride ($(C_8H_{13}NO_2HCl)_2 \cdot PlCl_4$) is precipitated in glutinous flocks upon the addition of ether to mixed alcoholic solutions of arecoline hydrochloride and platinic chloride. After being washed with ether-alcohol and dissolved in water, it crystallizes from this solution upon standing over sulphuric acid in handsome well-formed rhombic orange-red anhydrous crystals, melting with frothing at 176° C. With cadmium chloride arecoline hydrochloride appears to form several crystalline double salts, readily soluble in water and difficultly soluble in alcohol.

Without doubt, arecoline is the physiologically active constituent of the areca nut, and the one upon which its action against tapeworm is dependent. It appears in this respect, as well as in its composition and properties, to stand near to pelletierine, one of the alkaloids of pomegranate root bark, which is also liquid and volatile, and has a composition, according to Tanret, corresponding to the formula $C_8H_{15}NO$.

Arecaine ($C_7H_{11}NO_2 \cdot H_2O$), purified by repeated crystallizations from 60 per cent. alcohol, forms colorless crystals, permanent in the air, freely soluble in water and in dilute alcohol, less soluble in stronger and nearly insoluble in absolute alcohol, by which it is dehydrated. It is also insoluble in ether, chloroform and benzol. The aqueous solution is neutral in reaction and has a slightly percepti-

ble weak saline taste. At 100° C., arecaine loses its water of crystallization, melts with frothing at 213° C., and carbonizes when more strongly heated. In a solution acidulated with sulphuric acid potassium-bismuth iodide produces an amorphous red precipitate that very quickly becomes crystalline. Potassium-mercury iodide is far less delicate; it does not precipitate the (neutral) solution of the free alkaloid, but if this be acidified the double salt separates in yellow needles, or at first as an oily precipitate that quickly crystallizes. Potassium iodide also fails to affect a neutral solution, but upon acid being added dark-colored needles separate. Phosphomolybdic acid, as well as tannic acid, give a slight turbidity; picric acid gives no precipitate, and gold chloride and platinic chloride precipitate crystalline double salts from solutions that are not too dilute.

Arecaine combines with acids to form crystalline salts, having an acid reaction, freely soluble in water and less soluble in alcohol.

In respect to its properties arecaine comes near to trigonelline (methylnicotinic acid), from fænugreek, and probably resembles it in being a betaine-like body. Further experiments in this direction could not, however, be carried out for want of material. Like betaine, arecaine has proved inert in experiments upon animals.

The third areca alkaloid mentioned could not be closely examined, since the small quantity at disposal was not sufficient for the preparation of the pure compound. It was amorphous, easily soluble in water, alcohol and chloroform, difficultly soluble in ether, and had a strongly alkaline reaction. The platinum double salt crystallized in flat prisms or tables.

PHYSIOLOGICAL ACTION OF ARECOLINE.

The investigation of the physiological action of arecoline has been carried out by Dr. Marmé of Göttingen,[1] who used for this purpose the hydrobromide and the hydrochloride, of which subcutaneous or intravenous injections were made, or sometimes the solution was applied to the conjunction of the eye. It was found that full-grown rabbits died within a few minutes after the subcutaneous injection of 25 to 50 milligrams, but recovered after 10 milligrams. Cats succumbed after administration similarly of 10 to 20 milligrams; only the course of the poisoning was somewhat more prolonged. Dogs, even

[1] *Pharmaceutische Zeitung*, February 9, p. 97.

small animals of five to six kilograms body-weight, although strongly poisoned by the subcutaneous injection of 50 to 75 milligrams were not always killed.

The symptoms of poisoning which were observed corresponded in many respects with those seen by Schmiedeberg in his investigation of muscarine, and further, when lethal doses were not used, they could be neutralized by means of atropine sulphate; eventually however they presented characteristic differences. The most dangerous action of arecoline consists in the slowing of the heart's action by small doses, or even its stoppage, just as takes place with muscarine; but the latter works in smaller doses, and it is only after somewhat larger doses of arecoline that the ventricle of the frog stops in diastole or is so influenced that the ventricle is not emptied and only after long intervals makes a weak undulatory muscular contraction. Subsequent injection of atropine removes this action upon the heart. Simultaneously with the heart's action the respiration is also affected. Small doses cause a considerable increase in the number of inspirations; larger doses cause a slower action with intensified expiration; and very large doses rapidly stop the breathing, especially in cats. After intravenous injection of a lethal dose the respiration usually ceases before the action of the heart.

The subcutaneous injection of 50 to 70 milligrams of arecoline salt into dogs of four to five kilograms body-weight, besides strong irritation of the heart, gives rise to tetanic cramps, which quickly give place to a partial paralysis. As a rule, however, the animals overcome the effects of such doses, the heart resuming its action completely as the effects pass off, but it becomes again affected through vomiting and liquid evacuations in which sometimes also worms are brought away. An increased peristaltic action of the bowels is, however, provoked in rabbits, dogs and cats, by much smaller doses.

Intense poisoning of dogs, rabbits and cats with arecoline may also be accompanied with so strong a contraction of the pupils of both eyes, that in dogs and rabbits they do not show larger than the head of a good-sized pin, whilst in cats they are reduced to a mere streak. Instillation of arecoline solution in an eye gives rise also to a strong one-sided narrowing of the pupil, but the quantity required is so large that the production of myosis in one eye may induce a flow of saliva in rabbits, and affect the heart and respiration in cats. For

this reason the action of arecoline upon the human iris has not yet been tested.

Arecoline separates unaltered with the secretions and excretions, from which it can be recovered. In the absence of a characteristic color reaction, arecoline separated from urine can only be identified chemically by its behaviour with potassium-bismuth iodide, and physiologically by its action upon the heart of a curarized frog.

It has been stated by various authorities that the chewing of the areca nut gives rise sometimes to poisonous symptoms. As the natives of India and the neighboring islands chew principally the juicy kernels of the younger areca nuts with some quicklime and a leaf of *Piper Betel,* or older nuts that have been submitted to a preliminary treatment with hot water, it can be understood that these morsels contain little of the easily soluble arecoline, and that therefore it is only seldom that poisonous symptoms are observed, and then as a rule not in natives. But it is also in accord with observations made during the experiments on animals that the organism may become gradually tolerant to the poison of areca nut, as in the case of the smoking and chewing of tobacco.

In the opinion of Dr. Marmé the physiological experiments indicate that the areca nut may prove a valuable article of the materia medica, since there can be no doubt that arecoline hydrobromide is capable of being utilized therapeutically on account of its effect on the peristaltic action of the bowels, and on entozoa, and also in suitable combination as a cardiac remedy.—*Phar. Jour. and Trans.*, Feb. 23, p. 667.

COTTON-SEED OIL AND BEEF FAT IN LARD.[1]

By J. A. Wilson.

Up to some time ago, the positive detection, not to say the approximate determination, of cotton-seed oil and beef fat in lards was of a difficult character, but the discovery of certain optical and general tests has rendered this problem tolerably easy. Some time ago the author had reason to examine two samples of old cotton-seed oil, which had been in the laboratory thirteen and seventeen months

[1] From *Chemical News*, March 1, p. 99. See also Amer. Jour. Phar., 1888, p. 573–578.

respectively, and although the samples responded clearly to the general tests, on applying the silver test in the different forms prescribed, no reduction occurred alone or when mixed with genuine lard. Here then we have a serious objection to these silver tests, for the matter causing reduction of silver nitrate seems to be destroyed by keeping; hence a reaction with silver nitrate proves the presence of cotton oil, but no reaction does not prove the absence in lard.

Chemists having old samples of oil in their possession will render service by trying the silver nitrate reaction on the oils. It is to be remarked here that I tried the reaction on the fatty acids produced by saponification, with a negative result. By acting on the oil by sulphur chloride, small percentages of cotton oil can be detected.

Researches on this subject have been published by Mr. Warren. Some time ago the author made some experiments on the surface tension tests for oils. Pure dry melted lard, dropped on water of 100° F., does not extend or increase in size. Beef fat or mutton fat extends over the surface of the basin, breaking up into innumerable droplets, and is agitated by a rapid gyratory motion.

The author mixed pure lard with 10, 15, 20 and 25 per cent. of beef fat, and allowed one drop to fall on water of 100° F. By noticing the degree of expansion and the time required, approximate determinations of the beef fat can be obtained. Mutton fat behaves similarly, and therefore cannot be distinguished. On repeating this with exactly the same lard eight months after, the drop behaved exactly like beef or mutton fat, this being most unfortunate. The only other test is the delicate test with iodo-mercuric chloride of Hubl. This method is one of the most delicate and best in the chemistry of oils and fats. The author's experience is most extensive, its results are exact and reliable. Somewhat discrepant statements exist, however, as to the iodinic absorption of cotton-seed oil and lard. Thus Pattinson (*Journal Society Chem. Industry*, No. 1, vol. viii.) gives from 57 to 63 per cent. iodine absorbed by lard, and 105 to 116 per cent. for cotton oil. The author has never found more than 60 per cent. for lard and 110 per cent. for cotton-seed oil. Again, Pattinson gives 41 per cent. for beef fat, whilst my figures approach the average, 44 per cent. It is needless to say these different statements would cause grave errors in calculating the foreign fat in a sample of lard. It would be of great service if chemists would state their experience of this most excellent test. In my opinion no satisfactory

statement of the amount of beef fat or stearin can be given in lard containing cotton-seed oil. The following table gives the maximum and minimum absorptions of iodine in the common oils I have found:

Name of Oil or Fat.	Maximum Absorption. Per cent.	Minimum Absorption. Per cent.
Cotton-seed Oil	110·11	106·0
Linseed "	149·10	148·07
Rape Oil (Stettin)	102·76	100·43
Castor Oil	83·40	.....
Palm "	52·40	51·01
Olive "	84·00	78·50
Neatsfoot Oil	70·70	70·00
Cocoanut "	9·35	8·97
Lard	60·00	57·10
Beef Fat	44·00	43·26
Mutton Fat	46·19	45·18
Bone "	49·58	46·27
Tallow	41·98	40·01

—*The Laboratory, Tottington Mill, near Bury.*

SYNTHETICAL PROCESSES IN THE ANIMAL ORGANISM.[1]

By E. Pflüger.

A living liver free from glycogen will again form that substance, not only from carbohydrates, but from glycerol, gelatin, or proteid. v. Mering fed dogs on phloridzin, whereby they became diabetic, and in a few days all carbohydrate material in the body had been discharged in the urine as sugar. If now the same drug was given to the same animals after a few days' interval, during which they had no food, they once more became intensely diabetic, and the quantity of sugar passed was so enormous that it cannot be supposed to have come from the drug itself (*Verhandl. des VI. Congr. inner. Med. Wiesbaden*, 1887). One explanation of the way in which glycogen is formed after the administration of glycerol, is the well-known "economy theory;" another is that glycerol and like substances act as stimuli to liver activity. It certainly cannot be supposed that glycogen is directly formed from the substance administered—or at least not in all cases; for instance, from ammonium carbonate. The question then arises as to the genetic relationship existing between glycogen and albumin.

[1] *Pflüger's Archiv*, xlii. 144–154; abstract from the *Jour. Chem. Soc.*, 1889, p. 174.

Experiments on the decomposition products of proteïds have in no case yielded a carbohydrate; and not only that, but proteïds never yield any of the decomposition products of carbohydrates (lactic acid, mucic acid, tartaric acid, etc.). Still, we have the formation of glycogen taking place in the liver when no food but albuminous food is taken.

The following general considerations will, however, lead to a better understanding of the subject. The chemical differences between animal and vegetable cells are not so great as was at one time supposed. Their chemical composition, so far as it is known, is the same; all living cells breathe oxygen, and produce carbonic anhydride, water and amido-compounds. If the synthetic processes are more highly developed in chlorophyll-holding plants, that does not mean that synthetic processes are absent from the animal cells. As instances of synthetic processes in animal cells, the formation of hippuric acid from glycocine and benzoic acid, or of ethereal hydrogen sulphates from phenol and sulphuric acid, may be taken. A special kind of synthesis must, moreover, occur in the retrogressive metamorphoses of proteïds which lead to the formation of uric acid and members of the same group. In albumin itself, and in the products of albumin obtained outside the body, the number of carbon-atoms is much greater than that of nitrogen-atoms (indol, leucine, tyrosine, etc.); but in these products of metamorphoses in the body, the nitrogen and carbon-atoms are nearly equal in number, or, as in the cases of urea and guanidine, the nitrogen-atoms are the more numerous. The importance of such synthesis occurring in living cells, resulting in the formation of cyanogen containing molecules, has been before insisted on by the author.

Researches on the formation of fat within the body show that here again there are undoubtedly syntheses occurring as the result of the activity of living cells; in fact, reactions occur which cannot be repeated in the laboratory or explained by any known chemical laws; they are, probably, therefore, the result of a breaking down of molecules in the first place, and the living cells then building up entirely new materials of a complicated nature from the simple carbon compounds so liberated.

The carbohydrates, for example, are derivatives of the hexatomic alcohol $C_6H_8(OH)_6$. But by feeding an animal on starch, the fat of the body is increased, and substances containing chains of 16 to 18 atoms of carbon linked one to another are formed; and in the case of

stearic acid, at least, we have a number (16) which is not a multiple of 6. By this synthesis, too, we have substances which possess the property of circular polarization changed into those which are optically inactive. The first change must, however, be a process of reduction; metabolic changes must occur, and no nutrient material stimulates metabolism like proteïd; this explains why feeding on starch mixed with a small amount of proteïd produces fat, and without it will not. The proteid mixture is, however, so small that it alone will not explain the great increase in fat. In other parts of the animal kingdom there are similar occurrences; for instance, the formation of beeswax from honey. Another sample of the same kind is the formation of fat from proteïd, although this is not so well proved as the foregoing cases. In the synthesis of fat from carbohydrate, the group CH·OH must be changed into CH_2; and in the formation of carbohydrate (glycogen) from proteïd, the group CH_2 must be changed into CH·OH; in both cases, numbers of these groups become linked together.

The close resemblance between animal and vegetable cells is further shown by the fact that many lower plants (bacteria, moulds, etc.), not only flourish in solutions of albumin and sugar, but actually shed out ferments to convert porteïd into peptone, and starch into sugar, and thus aid absorption. They breathe oxygen, produce carbonic anhydride, amido-derivatives, and, without the aid of sunlight, fat, carbohydrate and proteïd. Nägeli (*Sitzber. Bair. Akad. Wissensch.*, 1879) has, however, shown that these fungi will assimilate carbon from compounds in which it is combined with hydrogen (amines, etc.), but not from those where it is combined with nitrogen (cyanogen).

PHOTOGRAPHY.

By F. V. Butterfield.

(*Concluded from page* 158.)

This paper would be still incomplete without a slight reference to a few of the many useful applications to which photography has been already applied. Besides its extended use in portraiture, it has rendered invaluable service in astronomy, and paradoxical as it may seem, nebulæ, etc., have been photographed whose existence was utterly unknown, being invisible through the most powerful telescopes, until still larger were recently constructed, when, on a careful examination of that portion of the heavens indicated, the evidence of the sensitive photographic plate was fully borne

out. This is accounted for, however, by supposing that the light emitted by these nebulæ is extremely rich in chemical or actinic rays.

A grand international scheme has just been concluded with the object of a true stellar map of the entire universe. To this end photographic apparatus has been set up in the different observatories throughout the world.

By the Act of Parliament of 1871 for the prevention of crime, all criminals were ordered to be photographed during their incarceration. Some of them occasionally object to the process, and amusing incidents are related of the various "dodges" employed by the operators in securing negatives of the refractory and unwilling sitters.

In military operations its importance has not been overlooked, and a regular staff of photographers is kept at Shoeburyness.

In conjunction with the microscope, or photomicrography, good results have also been obtained, and it is even stated that "sharp" microphotographs have been secured of the ever changing amœba.

But one great problem still remains unsolved. I refer to photography in natural colors, or heliochromy. Many great workers have attempted to discover some method or means of attaining this, but hitherto it has eluded their grasp.

As the advent of photography dealt a death blow to the miniature portrait painting, which was so much in vogue at the time, it is almost certain that this branch, if ever brought to perfection, will finish the work the other begun, as the pictures so produced would be true to nature in all her beauty and perfect in every detail, and the different schools of landscape painters would sink into nothingness before the faithful reproductions of nature herself.

In attempting to treat a subject of such vast extent as photography in a short paper like this, much interesting detail has of necessity been omitted, and many very recent improvements perforce excluded. As stated at the commencement, the object throughout has been to confine the matter chiefly to the requirements of the beginner, enabling him to add another charm to his existence, to fully realize that a thing of beauty is a joy for ever, to redouble the pleasure of his annual holidays and keep them ever green by bringing back true representations of the most striking views and beauty spots encountered during his tour, or the features of friends far distant, whom he may have visited. At the same time, as much attention as possible has been given to the science of the subject, and throughout I have given those processes only which have always answered well in my own hands, and which I strongly advise the intending beginner to thoroughly master before trying any of the many new suggestions.

Potassium chloro-platinate and the salts of ferric oxalate are now being largely used in the different methods of platinum printing, which seems to be rapidly growing in favor. For comparison, I have here two specimens of this process; one, on the ordinary platinotype; the other, on Pizzighelli's platina paper, so that you may judge for yourselves.

A great deal of attention is being paid at the present time to orthochromatic photography, and already some are beginning to use these plates

entirely, instead of the ordinary gelatine dry plate. As previously stated, the sensitive films are stained with some dye in this process, and experiments are still being made to discover the one best suited for the purpose. Chlorophyll, cyanine and eosine have been largely used. It appears that cyanine blue makes the plate more sensitive to yellow or orange rays, whilst eosine absorbs in the green or green yellow; but pure red rays, as in the case of the ordinary plate, have little or no effect on plates prepared with either of them.

MINUTE OF THE COLLEGE MEETING.

The annual meeting of the members of the college was held this day in the College Hall, Charles Bullock presiding, eighteen members being present. The minute of the last stated meeting was read and, on motion, adopted. The minutes of the Board of Trustees for the months of January, February and March were presented and, by resolution, approved. Professor Maisch referred to the fact of a chart having been prepared, and with photographs of the college buildings and the text-books used, sent to the exhibition at Paris, illustrating the methods and results of the educational system of this college, and moved that the same be presented to the library of the Ecole de Pharmacie, Paris. Professor Remington moved that the gift be bestowed on behalf of the college through Mr. Jules A. Creuse, of 109 Boulevard San Michel, Paris. The resolutions were adopted, and the Secretary was directed to communicate with Mr. Creuse.

The Publication Committee reported the prompt and regular issue of the JOURNAL during the year past. The reports of the Business Editor and of the Treasurer of the Committee were also submitted, giving the financial statement and the balance.

The Editor of the JOURNAL submitted his report as follows:

TO THE PHILADELPHIA COLLEGE OF PHARMACY:

The editor respectfully reports that during the past year seventy original papers were published in the Journal, of which number twenty-eight were contributed by eight members of the College, and nineteen papers by fourteen authors who are not members. The remaining papers consisted of more or less extended abstracts of fifty-three theses of last year's graduating class. Twenty-four of the papers, a portion of them contributions from the College laboratory, were read at meetings of the College. In addition to the papers mentioned, each number of the Journal contained original translations, abstracts from European journals, also editorials, reviews, and other matter, prepared by the editor, besides the essays republished from other journals. While the number of papers read before the College was smaller than during the preceding year, they were of considerable interest, and contributed much to the usefulness of these meetings.

Respectfully submitted,

JOHN M. MAISCH,
Editor.

MARCH 25, 1889.

The Librarian presented his annual statement, giving a detailed list of the volumes added to the library. The report includes the statement that "there is now completed in our library some of the most valuable works of reference known to English, German and French readers."

The Curator offered the following statement:

MONDAY, MARCH 25, 1889.

TO THE MEMBERS OF THE PHILADELPHIA COLLEGE OF PHARMACY:

Gentlemen:—Your Curator would respectfully report, that the Museum is in excellent condition and has received, during the past year, a number of valuable accessions; notably a collection of botanical specimens prepared by Mr. E. M. Holmes, Curator of the Pharmaceutical Society of Great Britain, through Mr. Charles Bullock, of this city; a fine assortment of powdered extracts from Hance Bros. & White; a collection of pure spices, whole and ground, from Robert Shoemaker & Co.; an assortment of rare sponges from Wm. B. Burk & Co., and recently, at the Alumni Exhibition, an excellent display of some 30 assayed drugs, from Messrs. Gilpin and Langdon, of Baltimore.

Respectfully submitted,
JOSEPH W. ENGLAND.

The Committee on Deceased Members, through Mr. Procter, offered the following memoir of the late Claudius B. Linn, a graduate of this college, class of 1838.

Claudius B. Linn, a graduate of this college, Class of 1838, deceased in this city on the 6th inst., in the 73d year of his age.

Mr. Linn learned the drug business in the store of Henry Troth, and entered into the wholesale business under the firm name of Linn, Smith & Co., located on Market street, between 5th and 6th streets, north side.

In 1853 the firm retired from business, and Mr. Linn continued his connection with the drug trade as a commission merchant.

Mr. Linn took an active interest in the establishing of the Philadelphia Drug Exchange, and was an ex-President of that body.

The general disposition and integrity of character of Mr. Linn was recognized and appreciated by all of his friends and business acquaintances. The wholesale trade will regret the taking away of one who was always a welcome caller in their counting-rooms, and his personal friends will cherish the remembrance of his Christian and gentlemanly character.

Mr. Charles Bullock, of the committee, referring to the efforts to collect facts in the personal history and connection of the late Dillwyn Parrish with this college, stated that the members of the family had been applied to for some details but had not as yet responded. The facts that the deceased had long honored this college by presiding faithfully over its councils as its revered President, of his interest and labors in promoting its welfare, of the respect and influence which his connection inspired, constitute a valuable memento in the archives of this institution.

This occasion being the period of election of officers, the following names were placed in nomination: For President, Chas. Bullock: 1st Vice-Presi-

dent, Robt. Shoemaker; 2nd Vice-President, Wm. J. Jenks; Treasurer, William B. Webb; Correspondieg Secretary, Dr. A. W. Miller; Recording Secretary, W. B. Thompson; Librarian, Thos. S. Wiegand; Curator, Jos. W. England; Publication Committee: Henry N. Rittenhouse, Jas. T. Shinn, Chas. Bullock, Thos. S. Wiegand, John M. Maisch, Editor; Editor, John M. Maisch. The terms of the follwing trustees expiring with this date, John M. Maisch, Sam'l P. Sadtler and Robert England, these gentlemen were renominated. There being no opposing candidates to any of the foregoing nominees, it was on motion resolved that Mr. Chas. A. Heinitsh, of Lancaster, deposit an affirmative ballot, which being done, they were thereupon declared duly elected. It having been stated that Mr. S. S. Bunting, the Treasurer of the College, desired by reason of impaired health and serious threatening illness, to be relieved of a continuance in his position, a very general expression of feelings of sympathy and of regret of the loss to the College of his long-continued and faithful service as an officer, was offered by the members. The Secretary was directed to transmit to Mr. Bunting a minute of this, and to place an acknowledgement of his valued connection upon the record of the College.

Mr. William McIntyre referred to the successful character of the recent exhibit given in the College Hall illustrative of the progress of pharmacy, made under the auspices of the Alumni Association. Mr. Robert England moved a vote of thanks to the members of the Association for their labors in this behalf, which was adopted.

A motion to elect delegates to the Session of the American Pharmaceutical Association to be held at San Francisco in June next, as well as to that of the Pennsylvania Pharmaceutical Association convening at Scranton in June, resulted in the following:

To the American Association, Charles A. Heinitsh, Joseph P. Remington, Charles Bullock, John M. Maisch.

To the Pennsylvania Pharmaceutical Association, William McIntyre, E. C. Jones, Gustavus Pile, Alonzo Robbins, Wallace Procter.

For the unexpired term of William B. Webb, Trustee (now Treasurer), Samuel S. Bunting was unanimously elected.

On motion the President was directed to appoint three delegates to the Convention to revise the United States Pharmacopœia to be held in Washington in May, 1890.

On motion, adjourned.

WILLIAM B. THOMPSON,
Secretary.

PHILADELPHIA, March 25, 1889.

Oleoresin of Aspidium has been given by Dr. J. O. De Man (*Ther. Mon.*, January, 1889), in doses ranging from 2 to 9 drachms, the average being from 5 to 6 drachms. It was given in capsules in 28 cases, repetition of the dose being necessary in three cases only, because the first dose was vomited. The tapeworm was expelled in two or three hours.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, March 22d, 1889.

The meeting was called to order, and, on motion, Mr. McIntyre was called to the chair.

The Secretary called attention to a specimen of *carbonate of ammonia* of American manufacture; it is made at Detroit, and is now largely displacing the English made article; it is packed in strong barrels and keeps well; it ordinarily sells at a slightly lower price, but has a peculiar slight odor, recalling that of stale urine.

The J. B. Lippincott Co. presented to the library a handsome special index copy of the sixteenth edition of the United States Dispensatory bound in sheep, and the Committee of Revision of the Pharmacopœia a copy of Part I of the Digest of the Criticisms of the United States Pharmacopœia of 1880. The thanks of the College were ordered to be returned for the works presented. The last volume of the Encyclopædia Britannica was also laid before the meeting. It is stated by the publishers that a supplementary volume will be issued in a year or two.

Albert P. Brown, Ph. G., read a paper upon *Oleate of Mercury*, and stated that the result of the process detailed was preferable to that of the officinal process; several samples of the oleate made by processes of double decomposition were exhibited. Mr. Beringer thought that Mr. Brown's process was a step in the right direction, and the nearer we came to definite chemical compounds the better. He thought that a better process was to make a true sodium oleate from soda and oleic acid, and then decompose it with mercuric chloride. Using zinc sulphate an excellent oleate of zinc could be obtained by the same process.

Professor Maisch exhibited a specimen of a drug sent to him by Mr. Wm. B. Addington, Ph. G., of St. Louis; it is known in Mexico as *jamaica*. Examination shows it to consist of the calyses of *Hibiscus Sabdariffa*. It is a refriggerant and contains, according to Dymock's Drugs of India, beside watery extractive, cellulose, and ash, tartaric acid 9·9 and free malic acid 15·54 per cent.; these figures seem to be too high, as its taste would be much more acid if it contained such a large proportion of free acids.

Mr. Beringer showed a specimen of a yellow bark imported into New York from South America, but no further history of it could be obtained as the consignee has died; it has an extremely bitter taste.

A paper on *Adulterated Flaxseed Meal* was read by Mr. Beringer.

There was some discussion about the advisability of adding to the definition of the Pharmacopœia a test for the absence of starch, and of increasing the minimum percentage of oil from 25 to 30, which would prevent the addition to flaxseed meal of a limited amount of cake meal, considered necessary by some for the longer preservation of the oil.

Mr. Meyer referred to the cleansing of mortars used for acrid substances such as piperine, etc.; he thought it was a matter of sufficient importance to claim close attention; powders mixed in a mortar that had been prev-

iously used for an acrid substance may be so changed in taste as to alarm customers and make them suppose a mistake had been made; digesting acids in the mortars had been tried, but even that had failed to remedy the trouble. To prevent such annoyance it was recommended to have certain mortars that should be used only for acrid powders. On motion adjourned.

T. S. WIEGAND,
Registrar.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

Philadelphia College of Pharmacy.—The examinations of the *junior students* were held November 10th, December 8th, and February 14th, the questions in the different branches being as follows:

BOTANY AND MATERIA MEDICA.

1.—What is a root? How does it grow in length? What are adventitious roots? Give some account of biennial roots. Name one or more perennial herbs, and state which part of these plants is perennial, and from which part the overground stems grow.

2.—Define parenchyma, and illustrate by drawings some of its different forms. What are stone cells? Give an example. What is cork, and where is it formed? How are ducts formed; how are they marked, and with what other cells are they usually associated?

3.—What is a leaf? Describe, commencing with the upper surface, the different tissues of a leaf, giving for each tissue the kinds of cells and their arrangement. What other plant organs are leaves in a modified form? Describe briefly for each of these organs the nature of the modification.

4.—Explain by description and sketches the arrangement of fibrovascular tissue, both for monocotyledons and dicotyledons, in the root; in the stem, and in the leaf.

5.—Give the botanical characters of the order of *Labiatæ*. Name the plants yielding *Peppermint* and *Spearmint*. By what characters may the two plants be distinguished? From which of these two plants and in what manner is *menthol* obtained?

6.—Name one or more officinal drugs obtained from each of the following orders: Geraniaceæ, Umbelliferæ, Loganiaceæ, Solanaceæ. Which of the drugs named by you contain poisonous alkaloids?

THEORY AND PRACTICE OF PHARMACY.

1.—Describe the Metric System. What are the units? How were they derived? Why is it sometimes called the Decimal System? What prefixes are used to express the multiplication or division of the units? What advantages does the system possess over all others? What are its disadvantages?

2.—State and illustrate the different principles which govern the evaporation of liquids at or above the boiling point, and below the boiling point. What is the proper shape for vessels to be used for evaporation below the boiling point?

3.—Write out a description of a good hand-power drug mill, suitable for the needs of a pharmacist. Illustrate the various parts by drawing such simple sketches as you deem necessary to explain the action of the mill.

4.—What is meant by circulatory solution? Give the reasons why a solid substance should be agitated in contact with a solvent, if rapidity of solution is desired?

5.—Describe briefly the various processes that a drug like a Medicinal Root should undergo, from the time it is taken from the earth until it is made into a liquid extract?

6.—How many strengths of Water of Ammonia are officinal? Describe a process for making Water of Ammonia? What is the commercial name of the Water of Ammonia found in the market, which differs in strength from either of the officinal kinds? What precautions are necessary in handling stronger Water of Ammonia?

CHEMISTRY.

1.—How do we measure changes of temperature most accurately? What are the two scales now officinal in the U. S. Pharmacopœia? Convert 98° F. into C. degrees, 15° F. into C. degrees, and 79° C. into F. degrees.

2.—What is the composition of white light? State how this composition of light can be ascertained. What valuable method of chemical analysis has been based upon this property of light?

3.—Define an acid, a base, and a salt, and illustrate by an example of each. What is the difference between an acid salt, a neutral salt, and a basic salt? Give an example of each class. Give the correct chemical names for HI. $Ca(OH)_2$. KNO_3. $NaHCO_3$ and Na_2HPO_4.

4.—Write in chemical symbols two reactions for the manufacture of chlorine. State how a lighted taper burns in chlorine, and give the reason for its behavior. State the circumstances under which chlorine has a bleaching action, and explain this action.

5.—Complete the following reactions, and name the several substances used in the reactions, and the products obtained.

$$Na\,NO_3 + H_2SO_4 =$$
$$Ca_3(PO_4)_2 + 2H_2\,SO_4 =$$
$$Ca\,CO_3 + 2\,HCl =$$

6.—How is boric acid obtained? Describe *acidum boricum* and *sodii boras*. Give the chemical formulas for both of these compounds.

QUESTIONS BY THE EXAMINING COMMITTEE.

1.—How many cubic centimeters would 1000 grams of glycerin occupy if it is one and a quarter times as heavy as water? How many grains would a fluidounce of the same liquid weigh?

2.—How many grains of each of the ingredients will be needed to make one pound, avoirdupois, of a mercurial ointment, if it requires mercury 45 per cent., lard 20 per cent., suet 20 per cent., compound tincture of benzoin 5 per cent., mercurial ointment 10 per cent.

3.—Give the full English and popular synonyms of the following officinals Ceratum Resinæ, Hamamelis, Sambucus, Ichthyocolla, Mistura Magnesiæ et Asafœtidæ, Mistura Potassii Citratis, Pilulæ Aloes et Mastiches, Potassii et Sodii Tartras, Unguentum Hydrargyri Nitratis, Unguentum Aquæ Rosæ.

4.—Give the botanical name, natural order and habitat, of the plants which yield the following drugs. Specify the part used, and state the officinal title of each drug:—Levant Wormseed, Koosso, Red Rose, Sage.

5.—Illustrate by diagram each of the following forms of leaves:—Lanceolate, Ovate, Cordate, Peltate, Pinnate, Bipinnate. Write the name of each form just below its illustration.

SPECIMENS.

Santonica.	Aqua anisi.	Sodii boras.
Sambucus.	Spirit. Lavandulæ.	Sodii bicarbonas.
Cetraria.	Extract. Gentianæ fl.	Acid. phosphoric.
Anthemis.		

The examinations at the close of the senior course occupied five days and were conducted as follows:

MATERIA MEDICA AND BOTANY.

A.—Belladonna root.—Give the botanical name of the plant, its natural order, and its habitat. Describe the drug, including its structural characteristics. Is the young root or the root from old plants preferable, and why? How may the trimmed root be distinguished from marshmallow root? What alkaloids are found in this drug, and what is the percentage of alkaloids? Give some characteristics of the principal alkaloid. State the medicinal effects of the alkaloid. Give the medicinal doses of the root and of the alkaloid.

B.—Menispermum.—Name the plant, its natural order, its habitat, and the part employed medicinally. Describe the drug; also its structure, and state in what respects this structure differs from that of the overground stem. Name the principal constituents of the drug, its medical properties, and state its dose.

C.—Guaiacum wood.—What is the name of the plant, its natural order, and its habitat? Which portion of the wood is used? Describe it, including the structure. What amount of resin does the wood yield? Give a color reaction of the resin, and state the effects of some solvents upon it. What impurities are found in the commercial resin? Give the dose of the resin.

D.—Acrid barks.—Name the officinal barks having a strongly acrid taste. State to what principles the acrid taste is due in each case. Describe the main characteristics—other than taste—by which these barks may be recognized or distinguished from one another.

E.—Savine.—Name the plant, its natural order, its habitat, and the part collected. Describe the drug, stating also the cause of certain differences in its appearance. Give the medical properties and dose of the drug. Describe the physical properties of its most important constituent, and give its chemical composition. Name principles of the same composition obtained from other plants of the same natural order, and state in each case from which part of the plant it is obtained.

F.—Umbelliferæ.—Give the botanical characters of the natural order relating to the fruit. Name the officinal fruits of this order. State the number of oil tubes found in each of these fruits, and give brief characteristics of the volatile oil of each. Which umbelliferous fruit is collected before ripe, and why?

G.—Seeds.—Name the pharmacopœial seeds, which are free from albumen (perisperm) and have a straight embryo. Give for each seed the medicinally important principle. State in which tissue of the seed each principle is contained; also, the percentage, and the principal characteristics of each of these principles.

H.—Lupulin.—Name the plant yielding lupulin, its natural order, and its habitat. State from what part of the plant lupulin is obtained, and how it is collected. Describe its physical appearance, its structure, and the effect of different simple solvents upon it. Which are its important medicinal principles, and how are these affected by exposure to the air?

I.—*Guarana.*—Give the botanical origin of the drug. State what part of the plant is used, and how it is prepared for the market? Describe the drug; and state the effect of simple solvents upon it. Name its principal constituents and their percentage. Give a process of assay for the alkaloid present. What other plants contain the same alkaloid?

K.—Adulterations.—Describe the processes, with the necessary details, for detecting the following: 1., Barium sulphate in cochineal; 2., Chalk in saffron; 3., Rosin in chinoidine; 4., Oil of sassafras in oil of gaultheria; 5., Corn starch in powdered tragacanth.

THEORY AND PRACTICE OF PHARMACY.

A.—1. A druggist was offered *forty pints of glycerin* (U. S. P.) valued at 40 *cents* per pound (Av.), in exchange for *twenty gallons* of *Stronger Water of Ammonia* valued at 12 *cents* per pound (Av.). How much would he gain or lose by the transaction?

2. If Syrup of Hydriodic Acid contains one per cent. by weight of Hydriodic acid (HI, molecular weight 127.6), and has the specific gravity of 1.300, how much iodine would be required theoretically to make one pint of Syrup?

B.—Give the unabbreviated officinal names, ingredients, brief outlines of process, and describe the appearance of Diluted Nitrate of Silver, Fluid Extract of Belladonna, Bitter Wine of Iron, Neutral Mixture, Extract of Colchicum Root, Griffith's Mixture, Tincture of Capsicum, and Compound Powder of Rhubarb.

C.—Give the English names, synonyms, ingredients, and describe the appearance of Mistura Ferri et Ammonii Acetatis, Pulvis Ipecacuanhæ et Opii, Ceratum, Syrupus Scillæ Compositus, Tinctura Cinchonæ Composita, Pilulæ Antimonii Compositæ, Emplastrum Ichthyocollæ, Spiritus Aetheris Compositus.

D.—Describe three methods for obtaining volatile oils, illustrate each by naming a volatile oil obtained by the particular process that you have described. Name three of the common adulterants of volatile oils, and state how each may be detected.

E.—Give the principal tests of identity for Santonin, the Aloins, Salicin, Strychnine, and Veratrine.

F.—Name three ferments obtained from animal substances, and describe the appearance of the ferments as they are found in commerce. State the special medical use of each.

G.—What is meant by the terms Chemical, Pharmaceutical and Therapeutical Incompatibility? Write out a prescription illustrating each.

H.—1. Write out a prescription for one pint of 50 per cent. emulsion of cod liver oil, and describe the best process for making it.

2. Write out a metric prescription for one hundred pills, each to contain $\frac{1}{50}$th of a grain of Strychnine with 3 grains of Iron by Hydrogen, and name the best excipient for the pill.

I.—What additions could be suggested for each of the following prescriptions, which would not interfere with their medicinal effect, and yet improve their appearance:

℞		℞	
Acid. Salicylic	ʒ ij.	Strychninæ	gr. j.
Potass. Acetat	ʒ iij.	Ferri Pyrophosph	ʒ ij.
Syrupi,		Acidi Phosph. Dil.	
Aq. Destill	aa fʒ ij	Syr. Zingiber	aa fʒ ij.

K.—Examine the following prescriptions, and if you would dispense them, state the proper method, explaining the difficulties, if any exist, and give the quantity of finished preparation in each case.

℞		℞	
Quin. Disulph	gr. x	Sodii Chlorid	ʒ ij
Acid. Sulph. Dil	fʒ j.	Potass. Chlor	ʒ iiss.
Infus. Ros. Comp	ad fʒ iv.	Acid. Hydrochlor	fʒ iv.
		Aquæ,	ad fʒ iij.
		M. Ft. guttæ s. a.	

CHEMISTRY.

A.—1.—Give the formulas of the several Phosphoric acids, of Phosphorous acid, of Hypophosphorous acid.
2.—Give the formula of a salt of each of these acids.

B.—1.—Enumerate the metals of the alkali group.
2.—How are they obtained in the free state?
3.—Give the chemical formulas of the officinal alkaline carbonates, nitrates, sulphates, and phosphates.

C.—1.—How is magnesium obtained?
2.—Describe the metal and state its distinctive characters.
3.—State how the "light" and the "heavy" carbonates of magnesium are obtained.
4.—Give the officinal names of the compounds obtained from these carbonates on ignition.

D.—1.—Describe the metal Zinc, stating fully its physical and chemical characters.
2.—What are the industrial uses of Zinc, its alloys and its compounds?
3.—What compounds are most important in their pharmaceutical uses?
4.—How do you distinguish Zinc from Aluminum in qualitative analysis?

E.—1.—From what sources and by what processes is metallic Silver chiefly obtained?
2.—What is the composition of the silver coinage alloy in general use?
3.—If *Argenti Nitras* is made from silver coin, how is it purified?
4.—What are the several officinal preparations of this salt?

F.—1.—What is the effect of oxidizing agents upon a primary alcohol?
2.—Illustrate this with a monatomic alcohol and with a diatomic alcohol, using as far as possible officinal compounds as examples.
3.—What is the difference between primary, secondary and tertiary alcohols?

G.—1.—Is there any chemical distinction between the fats and the waxes? Illustrate by formulas of each class.

2.—Write the reaction for the saponification of a fat by caustic alkali, by water, and by lime.

3.—Which are the most generally occurring fat acids?

H.—1.—Write the several reactions showing the derivation of aniline from benzene.

2.—How are these reactions carried out in practice?

3.—Write the structural formulas of the several derivatives referred to in your answer.

I.—1.—How would you define an alkaloid?

2.—By what reagents can alkaloids be detected?

3.—State the groups into which they are usually divided, and the differences upon which this grouping is based.

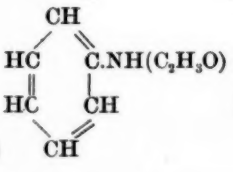
4.—What substances seem to be indicated as underlying the constitution of many of the alkaloids?

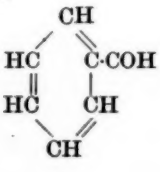
K.—Give both chemical and common names for the following compounds—

1. CHI_3

2. CCl_3 / $COH + H_2O$

3. $COOK$ / $CHOH$ / $CHOH$ / $CO.O(SbO)$

4. 

5. 

EXAMINING COMMITTEE.

A.—Opium.—1. Give the botanical name of the plant from which it is obtained. 2. How is opium prepared? 3. What Morphine strength is required by the Pharmacopœia for powdered opium? 4. Name all the officinal liquid preparations containing opium. 5. What percentage of opium is contained in each?

B.—1.—Name the officinal drugs obtained from the cotton plant.

2.—Name the officinal preparations into which they enter, directly or indirectly.

C.—1.—Describe three readily applied methods by which you could prove that your Sodium Bicarbonate receptacle had been carelessly filled with Sodium Borate.

2.—How is a mixture of fixed oil and water separated by filtration, if you desire to obtain the oil clear?

D.—How many grammes of strychnine will there be in two litres of Tincture of Nux Vomica, U. S. P., if its specific gravity is ·900, and the dry extract contains 8·8 per cent. of the alkaloid? Show all figures used in obtaining your answer.

E.—1.—Give the botanical names of five plants which owe their activity to alkaloids which are themselves officinal.

2.—Name these several alkaloids and any of their salts that may be officinal, together with the adult dose of each of the latter.

F.—1.—What is the officinal name of White Mustard?

2.—Give the natural order, habitat, and description of the plant yielding it.

3.—Is there any other variety of Mustard officinal? If so, what is it called?

4.—To what principle does White Mustard Seed owe its rubefacient properties? How is this principle developed?

5.—Name an officinal liquid derived from Mustard, and state from which variety it is obtained.

6.—Is whole Mustard Seed used internally? What are its medical properties?

G.—1.—Describe the officinal process for fluid extracts.

2.—Describe briefly the process of *repercolation*, and state what advantages it possesses over simple percolation.

3.—Why are different strengths of alcohol directed in the preparation of fluid extracts?

4.—Mention a fluid extract made with alcohol, and one with diluted alcohol, and give the reasons for their use in each case.

H.—1. How would you compound the following prescription? Would it make a good antiseptic lotion? Criticise.

℞

Potass. Permanganat.	gr. xx
Glycerini	ʃ 3 ij
Tr. Opii	ʃ 3 ss
Aquæ	q. s. ft. ʃ 3 viij

M. Ft. "Antiseptic lotion."

Sig.—Use freely to avoid infection.

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2. Copy the following prescription, writing out the names in full of the quantities, and state how you would prepare it?

℞

Tr. Ferri Chlor.	12	5
Sol. Ammon. Carb.	60	
Sol. Acid. Acetic.	60	
Morphinæ		245
Elixir. Simp.	60	
Acid. Acetic.	4	15

M. Ft. Mist. sec. art.

Sig.—Dessertspoonful every 4 hours.

I.—3. How should this prescription be prepared—

℞

Hydrarg. Chlor. Mit.	gr. ij
Antim. et Potass. Tart.	gr. ss
Pulv. Ipecac. et Opii	3 ss
Tinct. Aconiti	gtt. xxiv
Tinct. Verat. Virid.	gtt. xxiv
Sacch. Alb.	3 j

M. et in chart. No. xii. divid.

Sig.—One to be taken every 3 hours.

4. Is this prescription safe? Give reasons for your conclusion.

℞

Acid. Arsenios	gr. iss
Hydrarg. Chlor. Corros.	gr. iss
Strychninæ	gr. j
Morphinæ Sulph.	gr ij
Ferri Reducti	gr. lxiv

Misce, ft. massa et in pilulæ. No. xxxii. divid.

Sig.—One to be taken 3 times a day.

K.—5. Describe the appearance of the following prescription. Criticise.

℞

Quininæ Sulph.	gr. xxxii
Acid. Sulph. Aromat	3 ss
Syr. Zingiber	ʃ 3 j
Aquæ	ʃ 3 ij
Tr. Ammon. Valerianat.	ʃ 3 j

M. Sig.—A teaspoonful 4 times a day.

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6. Should this prescription be dispensed? Give reasons for your conclusions.

℞

Acid. Arseniosi	gr. v
Pulv. Opii	gr. iv
Ext. Gentian.	3 j

M. ft. mass et in pilul. No. xx. divid.

Sig.—One to be taken 3 times a day.

SPECIMENS.

Materia Medica.	*Pharmacy.*	*Chemistry.*	*Committee.*
Phytolaccæ radix.	Hydrarg. c. creta.	Aqua.	Prunus virginiana.
Aconitum.	Ferri sulphas præcip.	Acid. Phosphoric.	Quassia
Colchici radix.	Mistura Ammoniaci.	Acid. Tartaric.	Chimaphila.
Cinchona rubra.	Syrupus Rosæ.	Sulphur sublim.	Fœniculum.
Lobelia.	Infusum Digitalis.	Potassii Bicarb.	Oleum Gossypii.
Gaultheria.	Spirit. Aurantii.	Potass. Ferrocyan.	Pulv. Glycyrr. com.
Piper.	Mist. Fer. et Ammon. Acetatis.	Potassii et Sodii Tart.	Tinct. Tolutana.
Sinapis nigra.	Tinct. Cimicifugæ.	Sodii Bicarbonas.	Liq. Sodæ chlorat.
Sassaf. medulla.	Linim. Saponis.	Plumbi Oxidum.	Potassii Chloras.
Terebinthina.	Extr. Colocynth. cp.	Amylum.	Ferri Sulphas.

OPERATIVE PHARMACY.

Syrup.

Iodine.....109 gr.
Iron.....34 gr.
Sugar (granulated)....800 gr.
Distilled Water.....5 fl. dr.

Make two fluid ounces of Syrup of Iodide of Iron by the officinal process.

Powders.

℞ Cinchoninæ Sulphas.....ʒj
Glycyrrhiz. Rad. Pulv., gr. xxxvj
M. ft. chart No. xij.

Suppositories.

℞ Ext. Stramonii.
Acidi Tannici.....āā gr. iij
Ol. Theobromæ.....gr. c
Make six moulded suppositories.

Lozenges.

Chlorate of Potassium 60 gr.
Powdered Sugar.....200 gr.
Powdered Tragacanth 10 gr.
Make twelve lozenges.

Emulsion.

Make three fluid ounces of an emulsion, each fluid drachm to contain ten minims of Oil of Turpentine. Label the bottle with the name and quantities of all of the substances used.

ANALYTICAL CHEMISTRY.

Qualitative examination was required of officinal salts or mixtures of salts, either in the state of powder or in solution.

The competitive examination for the J. M. Maisch prize, offered by Mr. J. H. Redsecker, took place March 12th. Sixteen candidates were entitled to participate, by having attained the grade "very satisfactory" in the examination of crude drugs and in descriptive materia medica. The microscopical specimens consisted of mounted sections of the following officinal drugs: Apocynum, Aconitum, Cinnamomum (Chinese), Guaiaci lignum, Coriandrum, Juniperus, Stramonii semen, and Linum; also of a section of potato with cell contents, and of the epidermis of a leaf (Agave).

The following list gives the names of all the successful candidates entitled to receive the degree of Graduate in Pharmacy (Ph. G.) at the Commencement held March 19th, and includes several holding over from the preceding year; the titles of the theses presented are also given.

Harry Vin Arny, Louisiana, Parthenium Hysterophorus.
Samuel Aubley, Pennsylvania, Emulsions.

William Bishop Ayres, Maryland, Pharmacy Laws.
Francis Llewellyn Bacon, Pennsylvania, Collecting of Plants for Specimens.
Julius Leopold Baldauff, Kentucky, Rad. Verbasci Thapsi.
Lincoln Gray Barnitz, Pennsylvania, Advantages of Dilution and Solution.
Charles Llewellyn Barrett, Pennsylvania, Sugar-coated Pills.
Henry James Batdorff, Pennsylvania, Syrups by Cold Percolation.
Wm. H. Stevens Bateman, Pennsylvania, Deodorized Tincture of Opium.
David Fuller Bentley, Pennsylvania, Drug Milling.
Harry Rees Birch, Pennsylvania, Important Cereals.
Robert Perry Blackburn, Pennsylvania, Guarana.
Charles Henry Blouch, Pennsylvania, White Snake-root.
Charles Everett Boger, Pennsylvania, Compressed Tablets.
Frank Bowker, New Jersey, Laudanum and Paregoric.
Charles Edward Bowers, Pennsylvania, Oil of Maize.
David Buchanan Bowman, Pennsylvania, Mercurial Ointment.
Augustus Bradley, North Carolina, Psoralea melilotoides.
Walter Lee Brown, New Jersey, Use of the Microscope in Pharmacy.
Harry Edward Burget, Indiana, Erythroxylon Coca.
Simon Mark Butt, Ohio, Life of the Plant.
Frank Hamilton Carman, New Jersey, Pills and Excipients.
Frank Valorus Cassaday, Ohio, Euonymus atropurpureus.
Charles E. Cawley, Iowa, Hydrargyri Chloridum mite.
James Clavin, Texas, Algarobia glandulosa.
William Lowther Codville, Pennsylvania, Orange Tree and Products.
Percival Valentine Cooper, Pennsylvania, Protection to Chemicals.
Charles Marquis Cottam, Pennsylvania, Salix.
Harry Stockton Courson, Pennsylvania, Sulphur and Acids.
George Tindall Craig, Delaware, Pepsin Preparations.
John Henry Crass, New Jersey, Cardamomum.
Archie Darrah Crawford, Pennsylvania, Asclepias tuberosa.
Walter Beattie Crawford, Jr., Pennsylvania, Laudanum.
George James Crumbie, Pennsylvania, Percolation.
William Joseph Daniels, Colorado, Creasote and its Adulterations.
William Owen Davies, Pennsylvania, Eucalyptus globulus.
Pierre Beaumont Davis, Texas, Coffee.
George Arthur Deitz, Jr., Pennsylvania, Fabiana imbricata.
Thomas Donaldson, Delaware, Lappæ fructus.
James Louis Demoville, Tennessee, Preservation of Oils and Fats.
William Albert Dorman, Pennsylvania, Pills and Excipients.
Samuel Conier Du Bois, Pennsylvania, Emulsio Olei Morrhuæ.
Clifford G. Dunn, Illinois, Podophyllum.
Charles Wesley Simons Edenborn, Pennsylvania, Importance of Assayed Drugs.
Frederick Eft, New Jersey, Iris versicolor.
Clarence Selby Eldredge, New Jersey, Assays of Lime Water.
William James Enders, Pennsylvania, Apium.
Charles Samuel Deeg Ensminger, Pennsylvania, Iodoform.
William Evans, Pennsylvania, Bismuth and Preparations.
George W. Fehr, Pennsylvania, Quiz.
Claud Field, Indiana, Percolations.
Harvey James Fiet, Pennsylvania, Nickel.
Stephen Harvey Foulkes, Indiana, Officinal Preparations of Tar.
Walter Scott Froelich, Pennsylvania, False and True Senega.
Cromwell Pearce Gabell, New Jersey, Apis mellifica.
William Foster Ganster, Pennsylvania, Pharmacy of the 19th Century.
Richard Clement Geist, New Jersey, Euonymus atropurpureus.
Henry Robert Gillispie, Kansas, Nepeta Cataria.
Lewis Thompson Greenfield, Pennsylvania, Manaca.

Howard Ezra Griffin, Pennsylvania, Fluid Extract of Stramonium Seed.
Gottlieb Matthew Grosse, Ohio, Ferrum reductum.
DeWitt Clinton Guthrie, Pennsylvania, Syrup of Yerba santa.
Harry Capp Haak, Pennsylvania, Azalea.
Robert Anthony Hatcher, Louisiana, Tincture of Cantharides.
Samuel Light Hauck, Pennsylvania, Astragalus mollissimus.
Maximilian Hellmich, Pennsylvania, Citrine Ointment.
Frederick Gustave Hertel, Illinois, Marrubium and Bitter Principle.
Robert Crockett Hoffecker, Delaware, Petroleum and its Products.
Erdman Hoffman, Delaware, Oleatum Hydrargyri.
Andrew Greider Hostetter, Pennsylvania, Potassii Tartras.
Samuel Emerson Howell, Delaware, An Automatic Percolator.
Ward Dutcher Hume, Minnesota, Cocillana.
Oliver Barron Jacobs, Delaware, Compound Tincture of Gentian.
Henry Hughes James, Pennsylvania, Aluminium.
Peter Lawrence Jones, New York, Gelatin Coated Pills.
John Jacob Kappes, Ohio, Nutmegs and Mace.
Harry Baker Kantner, Pennsylvania, Sulphur.
John P. Kelly, New York, Blackberry Brandy.
Albert Dennis Kennedy, Pennsylvania, Determination of Specific Gravity.
John Frank Kilgus, Pennsylvania, Dobell's Solution.
William Michael Kilgus, Pennsylvania, Quinine Pills.
Charlie Davis Kingston, Missouri, Official Liquors.
Henry Leinbach Klopp, Pennsylvania, Observation in Pharmacy.
Peter Paul Klopp, Pennsylvania, Koumiss.
Henry Kraemer, Pennsylvania, Quercus alba.
Gustav Adolf Krauss, Germany, Rubus villosus.
Frederick William Krollpfeiffer, Pennsylvania, Assay of Opium.
Adolph Latin, Ohio, Mullein Leaves.
Arthur Morris Leine, Pennsylvania, Analysis of Milk.
John Becker Lesher, Pennsylvania, Importance of Attention in Pharmacy.
Griffith Robert Lewis, Pennsylvania, Tincture of Chloride of Iron.
Samuel Wesley Lippincott, Pennsylvania, Adeps Benzoinatus.
Joseph Lowenberg, Pennsylvania, Commercial Sulphate and Acetate of Morphine.
Charles Edward Reese McCloskey, Pennsylvania, Assay of Belladonna.
John Wanamaker McCouch, Pennsylvania, Syrups in general use.
Charlie Hunt McDowell, New Jersey, Cocaine.
Robert McFadden, Pennsylvania, Future of the Retail Drug Business in Philadelphia.
Joseph Allen McKee, Pennsylvania, Officinal Salicylates.
Charles Baynor McKeel, North Carolina, Sun Flower Seeds.
J. Irwin McKnight, Pennsylvania, Potassii nitras.
William Benjamin McMechen, West Virginia, Gum Arabic.
John C. MacMillan, Pennsylvania, Advantages of a Pharmaceutical Education.
Edward Dudley MacNair, North Carolina, Psoralea.
Robert Carson McNeil, Pennsylvania, Suppositories.
Gideon Hunt Macon, North Carolina, Pills of Permanganate Potassium.
Frank Street Macpherson, New Jersey, Oleum Gossypii Seminis.
Robert Wood Maris, Pennsylvania, Liquor Ferri Chloridi.
Henry John Mayers, West Virginia, Geranium maculatum.
Charles Clyde Meredith, West Virginia, Antipyrine.
Charles John Austin Miles, New Jersey, Borobenzoate of Sodium.
Louis Augustus Minner, Missouri, Oleum Peponis.
Henry Mittelbach, Missouri, Arum triphyllum.
John Moffet, Pennsylvania, Formulas of the New Pharmacopœias.
John Ellsworth Mohn, Pennsylvania, Suppositories.

John Daniel Moller, Pennsylvania, Urinum.
William Bossieux Moody, Virginia, Infusions.
Joseph Garrison Morris, New Jersey, The Medicinal Plants of Cape May County, N. J.
William Moss, Ohio, Carbolic Acid as a Disinfectant.
Reuben Emanuel Moyer, Pennsylvania, Hydrastis.
James Joseph Murray, Pennsylvania, Fluid Extract of Senega.
Aaron Wallace Musgrave, Pennsylvania, Commercial Mustard.
Carvosso Oursler Myers, Kansas, Scutellaria lateriflora.
Emma Bour Nardyz, Pennsylvania, Opium.
Milton Mackey Osmun, New Jersey, A Well-Regulated Pharmacy.
Harold Duche Owens, Pennsylvania, Emulsions.
Osmund Young Owings, South Carolina, Carbonates of Sodium.
Charles W. Palmer, New Jersey, Camphoral.
William Abner Pierce, Pennsylvania, Petrolatum.
M. Arthur Porter, Pennsylvania, Pharmacy Law of Pennsylvania.
John Franklin Potts, Pennsylvania, Fermentation.
Fred Briggs Quackenbush, New York, Officinal Tinctures.
Charles Carroll Ramsay, Iowa, Amylum.
George Herbert Ray, Oregon, Eupatorium purpureum.
Howard Lincoln Rayner, Pennsylvania, Phosphorus.
Joel Salter Reading, New Jersey, Syrups by Cold Percolation.
Thaddeus Rowland Redner, Pennsylvania, Fluid Extracts.
Howard Reed, Pennsylvania, Mercuric Chloride.
Edwin Stanton Reider, Pennsylvania, Medicinal Catechu.
Eugene George Reig, Pennsylvania, Japanese Aconite.
Howard Newton Richard, New Jersey, Mortars and Pestles.
Frederick Philip Riedenauer, Pennsylvania, Pills and their Coatings.
John Dauberman Rishell, Pennsylvania, Honey.
Leon Stewart Risley, Connecticut, Quebracho Blanco.
Cyrill Depue Rosenkrans, Pennsylvania, The Egg in Pharmacy.
William McOwen Ross, Indiana, Pressure Percolators.
Michael Joseph Rourke, Pennsylvania, Fluid Extract of Wild Cherry.
August James Schlaepfer, Indiana, Benzoated Lard.
Henry John Schulte, Ohio, Simaruba officinalis.
August Schutzenbach, Pennsylvania, Physostigma.
Leslie Watts Schwab, Illinois, Ambrosia artemisiæfolia.
Charles Albert Schwacke, South Carolina, Household Ammonia.
William Henry Schwenk, Illinois, Putrefaction and its Causes.
Joseph Bennett Sherman, Pennsylvania, Antiseptics.
Robert Simons, Pennsylvania, Black Pepper.
John Henry Seiffert, Pennsylvania, Thymol.
John Hamilton Small, Jr., Pennsylvania, Thea sinensis.
Frank H. Smith, Pennsylvania, Eupatorium.
John Stewart Smith, Kentucky, Bark of Prinos verticillatus.
Walter Valentine Smith, Pennsylvania, Medicinal Oleates.
Edward Stanhope Smythe, Texas, Gnaphalium polycephalum.
Isaac Morris Supplee, Pennsylvania, Lac.
Charles Morton Southall, Tennessee, Tobacco.
Willie Leisse Stephen, Pennsylvania, Alkaline Bromides.
Fred. Madison Stevens, Maine, Tea Analysis.
Aaron Walter Stewart, Pennsylvania, The Pharmaceutical Physician.
David Falls Swisher, Pennsylvania, Coniferæ.
Herbert Moodie Thompson, Pennsylvania, Coal Tar, its Origin and Products.
Edward Quin Thornton, Alabama, Antiseptic Ligatures.
Samuel W. Upham, New York, Silicate of Aluminium.
William Clinton Van Dyke, Pennsylvania, Sodium Silico-Fluoride.
Samuel Edward Wagaman, Pennsylvania, Sulphate of Morphine Granules.

J. Frank Wallis, Pennsylvania, Picrotoxin.
Percy Hall Ward, Maryland, Fluid Extracts.
Edmund Howell Watkins, Pennsylvania, Tincture of Nux Vomica.
Maurice Watson, Pennsylvania, Rheum.
Charles Henry Weaber, Pennsylvania, Pills and Pill Excipients.
William Weber, Pennsylvania, Liquor Plumbi Subacetatis.
Joseph L. Weil, Pennsylvania, Lycopus.
E. Riall White, Maryland, Incompatibility of Unguentum Belladonnæ and Tannin.
Robert Walter White, Pennsylvania, Sugar.
Joseph Washington Wischman, Pennsylvania, Acetic Acid.
John Howard Witherow, Pennsylvania, Pill Making in Pharmacies.
Harry Sudduth Wood, Kentucky, Glacial Acetic Acid.
John Stewart Woodruff, New Jersey, Pepsins.
Charles Young, Pennsylvania, Prescriptions and Dispensing.
William Corson Zinnel, Pennsylvania, Oleum Tiglii.

States and Countries represented by the Graduating Class: Alabama, Colorado, Connecticut, Germany, Maine, Minnesota, Oregon and Virginia, each 1 graduate; Iowa, Kansas, Louisiana, South Carolina and Tennessee, each 2 graduates; Kentucky, Maryland, Missouri, Texas and West Virginia, each 3 graduates; Illinois, New York and North Carolina, each 4 graduates; Indiana 5; Delaware 6; Ohio 7; New Jersey 17, and Pennsylvania 106 graduates.

On Monday evening, March 18th, the graduating class, in response to an invitation from the faculty, sat down to a supper in the museum of the college building, in company with the officers and trustees of the college, the occasion being enlivened by toasts, speeches and singing by the glee club.

At the commencement held on the following evening at the Academy of Music, the President of the College conferred the degree of Graduate in Pharmacy upon the candidates named above, and a certificate of Proficiency in Chemistry was awarded to Hermann J. M. Schroeter, Ph. G., for special studies in chemistry after having graduated in pharmacy. By direction of the Board of Trustees the degree of Master in Pharmacy was conferred—*honoris causa*—upon Charles Bullock of class 1847, T. Roberts Baker of class 1852, Joseph L. Lemberger of class 1854, Alonzo Robbins of class 1855 and Professor John M. Maisch. The Procter medal for highest grade of scholarship and meritorious thesis was awarded by President Bullock to F. B. Quackenbush of Penn Yan, N. Y., and honorable mention with the grade "distinguished" to H. V. Arny, G. A. Krauss, E. S. Reider, J. H. Small, C. M. Southall and J. L. Weil; and with the grade "meritorious" to J. Clavin, G. A Deitz, Jr., H. R. Gillispie, R. A. Hatcher, H. V. Haak, J. F. Kilgus, H. Kraemer and G. H. Ray. The Secretary of the College, Wm. B. Thompson, presented the Henry C. Lea prize, $100, for the most meritorious researches recorded in the graduating dissertation, to Henry Kraemer of Philadelphia, honorable mention being accorded to G. A. Krauss. The professors' prizes were awarded as follows: The Materia Medica prize, a Zentmayer microscope, for original histological work on an American plant, combined with chemical researches, to H. Kraemer, with honorable mention of the investigations by H. V. Arny and Geo. H. Ray; the Pharmacy prize, a gold

medal, for original pharmaceutical work to F. B. Quackenbush, with honorable mention of C. D. Kingston and S. E. Howell; the Chemistry prize, a chemical balance for original quantitative analysis to G. A. Krauss, with honorable mention of F. Y. Cassaday, G. A. Deitz, Jr., and Jos. L. Weil; and the Analytical Chemistry prize, $25, for laboratory work during the preceding year, to F. B. Quackenbush. The four remaining prizes were bestowed as follows: the John M. Maisch prize, $20 gold, offered by Mr. J. H. Redsecker, of Lebanon, Pa., for histological knowledge of drugs, to Aug. Bradley, with honorable mention of H. V. Arny, J. L. Baldauf, C. E. Bowers, J. Clavin, G. A. Deitz, Jr., W. A. Dorman, H. R. Gillispie, H. V. Haak, H. Kraemer, G. A. Krauss, F. B. Quackenbush, E. S. Reider, J. H. Small, C. M. Southall and F. M. Stevens; the Operative Pharmacy prize, $25 gold, offered by Mr. E. L. Boggs of Charleston, W. Va., for best work in operative pharmacy to W. B. Crawford, Jr., with honorable mention of F. B. Quackenbush, R. E. Moyer, J. E. Macmillan and J. B. Sherman; the Theoretical Pharmacy prize for best examination in that branch, a prescription balance, offered by Mr. H. J. Maris of Philadelphia, to E. S. Reider; and the Robinson gold medal, offered by Mr. Jas. S. Robinson of Memphis, Tenn., for proficiency in chemical knowledge and analytical work, to C. M. Southall.

The valedictory address was delivered by Prof. Maisch. The prerequisites for, and the aims of, special education were discussed with particular application to pharmacy. Since the establishment of the College, many changes have taken place in the practical conduct of the apothecary business. These changes are referable to the general progress of knowledge, the perfection of machinery and the division of labor in modern times, and are not confined to any particular locality or country. But the duty of the pharmacist toward the public remaining unaltered, he becomes responsible not only for the products made by himself, but also for those made by others, if he chooses to use such; and his field of labor, narrowed in one direction, would become largely extended in another, that of chemical and microscopical analysis. The changes in business methods have been followed by changes in the college curriculum; new chairs have been established; the didactic course of instruction was lengthened and widened; the auxiliary branches of science are more cultivated; facilities have been provided for laboratory work in chemistry, pharmacy and microscopy, and such work is urged—not as replacing practical experience in regular business transactions, but as aiding and supplementing shop instruction.

The exercises opened and were interspersed with music, and came to a close with the distribution of the presents sent upon the stage for some of the graduates.

Alumni Association, Philadelphia College of Pharmacy.—The twenty-fifth annual meeting was held on Friday, March 19th, 1889. The Secretary reported the addition of 171 new members and the death of 13; the Board meetings were held regularly, and increased interest in the social meetings was manifested; the Quiz classes were well attended and the reading room of the College had been re-opened during the Winter season. The Presi-

dent's address dwelled upon the successful exhibition held in commemoration of the silver anniversary and upon plans for the future usefulness of the association. The Treasurer reported the association in a very satisfactory financial condition. After other routine business, the election of officers was held as follows: Dr. B. Frank Sholl, class 1882, President; Wm. Nelson Stem, class 1873, and Joseph W. England, class 1883, Vice Presidents; Edward C. Jones, class 1864, Treasurer; Wm. E. Krewson, class 1869, Recording Secretary; C. C. Meyer, class 1873, Corresponding Secretary; Thomas H. Potts, class 1871, Henry A. Newbold, class 1870, J. Thomas Hoskinson, class 1871, and John A. Martin, class 1877, members of the Executive Board for three years. Trustee of Sinking Fund, Thomas S. Wiegand, class 1844. Orator for 1890, Emlen Painter, class 1864, New York City. This was the largest annual meeting ever held, no doubt on account of many druggists coming to visit the exhibition, being held at the same time.

In the evening the annual reception was held at St. George Hall, which was crowded. The annual address was delivered by Dr. Henry Fisher, class 1877; the class oration by Henry Kraemer of Philadelphia; the History of the Class, by Henry S. Wood of Kentucky; the Future of the Graduating Class, by Samuel E. Howell of Delaware, Class Prophet; and the poem was recited by James Clavin of Texas, Class Poet. The prizes as follows were awarded: The gold medal to F. B. Quackenbush of New York; and the following certificates: Materia Medica to H. R. Gillispie of Kansas; Pharmacy to E. S. Reider of Pennsylvania; Chemistry to G. A. Krauss of Germany; General Pharmacy to Harry Vin Arny of Louisiana; Operative Pharmacy to W. B. Crawford of Pennsylvania; Specimens to F. G. Hertel of Illinois; Analytical Chemistry to G. A. Deitz, Jr., of Pennsylvania; the testimonial to the Junior class was carried off by Ellis Beam Burgess of Pittsburg, Pa., and the prize certificate for the best collection of indigenous plants by Jos. L. Weil of Pennsylvania. The Zeta Phi Glee Club interspersed the exercises with songs and musical selections.

An "*Exhibition of Progress in Pharmacy and Allied Arts and Sciences,*" was held by the Alumni Association of the Philadelphia College of Pharmacy in celebration of its 25th anniversary. The exhibition was opened on Tuesday, March 12th, at 8 P. M., by a reception given to the Alumni and invited guests, and on the three succeeding days and evenings it was thrown open to the public, and was well attended by large numbers of visitors.

In the Library, the Instructor in Microscopy, Albert P. Brown, Ph. G., had arranged an elegant display in that branch, which was both entertaining, and instructive, and to many a revelation.

In the Museum which had been specially prepared with tables, draperies, lights, etc., French, Richards & Co., made a very fine display of some thirty rare drugs, such as cowage pods, white agaric, spunk, etc., also pharmaceutical preparations, a novelty being "liquid benzoin;" also a number of Torsion balances of which they are the agents in this city.

Henry C. Blair's Sons displayed choice coca leaves and preparations, new glycerin suppositories, etc., also their father's lecture tickets and recipe book of 1837.

Henry Troemner exhibited his renowned balances, amongst them being an assay balance used in the U. S. Mint 100 years ago.

Wm. R. Warner & Co. displayed pills, bromo-soda and various specialties; also their first business card, Quaker-like in its plainness, and their last one beautifully lithographed.

Zentmayer's Sons exhibited some of the microscopes which have made their house famous.

The Smith & Kline Co. displayed pharmaceutical preparations, such as liquors, elixirs, etc., also a number of rare and curious drugs, such as Guarana paste moulded in shape of a bird, cones, rings, etc., copaiba wood, East India rhubarb, and varieties of cardamom, vanilla, strophanthus, etc.

Croft, Allen & Co. showed candies, prepared San Blas cocoanut, various saccharine preparations, etc.

James T. Shinn exhibited liquid rennet, and also the rennet of our grandfathers. A bladder with a quill inserted, was entitled the syringe of a hundred years ago, and was explained by a copy of a prescription of July 3rd, 1776, "Send a bladder with a quill to give a clyster;" contrasted with this was the syringe of 1854, and the "Alpha" of the present time.

Mellor & Rittenhouse displayed liquorice and its preparations, and paraffin paper.

Graff & Dannebaum made a fine exhibit of Merck's rare chemicals, contrasted with which were some pharmaceutical preparations of by-gone days, like dog oil, goose greese, rattlesnake oil, oil of earth worms, etc.

Professor Maisch's exhibit had been tastefully arranged by Dr. Lowe. The lower part of the case was filled with many hued models of flowers, used in teaching botany, and contained also an original package of Para sarsaparilla from South America; a bundle of chirata from India; koosso flowers from Abyssinia; a monkey skin filled with aloes from Eastern Africa; specimens of cinchona barks from South America and India; pictures from China painted on thin sections of the pith of Aralia papyrifera (the so-called rice paper), etc.

Powers & Weightman's exhibit was "a thing of beauty," the centre being occupied with a handsome specimen of ammonium nitrate that looked like a fairy grotto; around the base were grouped many fine chemicals, the crystals of manganese sulphate and silver nitrate attracting special attention.

Rosengarten & Sons made a fine display of cinchona and opium alkaloids and other chemicals.

Hance Bros. & White had on exhibition various pharmaceutical preparations, special mention being made of their fluid extracts of ergot and belladonna. They also exhibited a mortar hollowed out of an oak log the bark still adhering, the pestle being of stone. It was owned by one of their ancestors, Major Paulding, who assisted in the capture of Major Andre, and was said to be about 175 years old.

Wilbur & Sons exhibited the fruit and seeds of Theobroma Cacao and a full line of preparations made therefrom, including cacao butter and chocolates.

Stevenson, Barnes & Jester showed bismuth subnitrate and other fine chemicals.

Chas. Shivers exhibited a line of plasters; also the original roll of adhesive plaster made in 1854, for which he received the silver medal from the Franklin Institute, and which is still in good condition.

Bullock & Crenshaw made a fine display of chemical apparatus, notably such of modern construction.

W. P. Burk & Co. showed different kinds of sponges and corks; also the Elma Company's medicated candies.

Gilpin, Langdon & Co., of Baltimore, showed a line of assayed drugs in fine powder and in a condition suitable for percolation.

In the Chemical Laboratory, J. M. Maris & Co. exhibited very attractive modern store furniture, among which was an elegant walnut prescription counter, section of shelving, etc., all fitted up in an elaborate manner. Directly opposite, and contrasting with these, was an imitation section of the store of Dr. Glentworth, of Chester and Race streets, which dates back to 1812; it was fitted up with some of the ancient drawers, bottles, ointment jars and scales loaned for the purpose. It is almost needless to say that it attracted great attention.

Professors Sadtler and Trimble displayed old and modern chemical and physical apparatus, such as microscopes, polariscopes, spectroscopes, dipping batteries, furnaces, etc., illustrating the vast improvements made in their construction.

Professor Remington and his assistant, F. G. Ryan, Ph. G., exhibited an instructive collection of pharmaceutical apparatus and preparations, the former arranged, in a number of instances, to show the evolution that has taken place in the same; thus, the pharmaceutical stills commenced with the old leaden one formerly in use by Prof. Procter, and ended with the modern "Remington still." The preparations of the students offered in competition for the Pharmacy prize attracted much attention; as did the model of the essential oil factory of Mr. Todd of Nottawa, Mich.; also the prescription file of the first year in business of the late Prof. Procter.

Frederick Gutekunst, class of 1853, the well-known photographer, exhibited specimens of his art, amongst them being photographs of the first building occupied by the College on Seventh street, the second building on Zane street, the present building on Tenth street, and the proposed new front (the latter from the architect's drawings).

Robert Shoemaker & Co. exhibited a fine line of drugs, extract of beef, etc.

Whitall, Tatum & Co. displayed an extensive variety of glass ware for the use of druggists, pharmacists, and for other purposes.

William Procter, Jr., Co., showed pepsin products; A. P. Brown, effervescing salts, and Keasby & Mattison illustrated magnesia and its products, of which they claim to be the largest manufacturers in the world.

In this room was shown the evolution of the drug mill from the model of the one found in the ruins of Pompeii (exhibited by Howard B. French) to the modern ones, like that of Hance Bros. & White; also the evolution of the soda water fountain, by Chas. Lippincott & Co.

H. K. Mulford & Co. attracted much attention by their crown compressed pill machine, as did Dr. McFerran, with his latest one, designed for the retail trade.

The annex to the Chemical Laboratory was fitted up with chemical apparatus in actual use, illustrating the processes of filtration by means of a vacuum, fractional distillation, combustion, etc. In marked contrast with the old Liebig combustion apparatus, in which charcoal was used, was the modern one, in which the easily regulated heat is produced by a row of Bunsen burners.

One of the most interesting features of the exhibition was the collection of rare and curious specimens of pharmaceutical and medical literature, some of the books dating back to the beginning of the sixteenth century. A recipe contained in one volume called for the flesh of a young man about 24 years of age, not too full blooded, and free from disease. The flesh was to be steeped in spirits of aloes and myrrh for a certain time, then dried by hanging in the air, then again steeped, and so on until fit for medicinal use.

Suspended over the case containing these works was the ancient and venerable looking sign of Townsend Speakman (the great-grandfather of Prof. Remington) who was in the drug business at Second and Market streets, prior to and during the revolutionary war.

Many other things deserve to be mentioned if space allowed; it is perhaps sufficient to say that as a whole the exhibition was instructive as well as beautiful, and symmetrical in all its arrangements, and received the highest praise.

The committee of the Alumni Association in charge of the exhibition consisted of Howard B. French, Prof. Joseph P. Remington, Dr. C. B. Lowe, Wallace Procter, and William Nelson Stem.

The Maryland College of Pharmacy held its thirty-seventh commencement March 26th, at the Lyceum Theatre when the following received the degree of Graduate in Pharmacy:—Edward H. Allen, *Charles C. Anderson, John M. Benton, T. H. Bien, J. W. H. Boone, *F. W. Bowers, William E. Brown, S. C. Chancellor, William M. Cohen, B. Cooling, Jr., F. W. Dickson, Jos. T. Doster, Louis Dreass, W. W. Frames, John A. Graham, *Charles E. Green, H. Hammerbocker, J. L. Houston, J. S. Johnston, A. E. Kiesling, Frank J. Kirby, F. W. Klingenhoefer, Louis Keuthe, F. W. Lelanze, A. M. Lichtenstein, Henry Linderman, F. R. McClure, Joseph W. Moore, E. A. Munos, John C. Norris, W. C. Parkhurst, H. B. Penn, George H. Rearick, L. S. Ricketts, D. W. Rintels, L. B. Sasser, Emil Schultze, H. V. Schumann, C. D. Sedberry, Charles Selden, E. S. Shannon, Whitfield G. Smith, R. S. Van Devanter, John J. Veasy, J. A. Wager, R. Frank Waters, William P. Way, J. W. Wescott, Thomas A. White, William A. Wright, J. Miles Yost.

Prizes consisting of gold medals were awarded to the four graduates whose names are marked with an asterisk (*).

The Cincinnati College of Pharmacy held its seventeenth commencement at Musik-Verein Hall, March 14th. The graduating class consisted of Aug. Bauer, Rufus S. Burnett, L. F. C. Cramer, Chas. Fleischmann, C. Fredericks, Jr., Wm. F. Fuldner, H. H. Grothaus, H. Herr, A. A. Krieg, Max Metzger,

G. J. Mitchell, Jos. W. Morford, Victor C. Muehlberg, H. Nippert, A. F. Schmidt, W. V. Skillman, H. W. Stegemiller and L. C. Widrig. According to the printed program, several prizes were awarded, and the Alumni Association made a presentation to the College. Addresses were made on behalf of the Trustees, by Prof. Dr. D. Millikin of the Miami Medical College, on behalf of the Faculty by Prof. T. H. Norton, Ph. D., also by the president of the College, A. W. Bain, and by the president of the Alumni, Ed. Muehlberg.

The Louisville College of Pharmacy held its commencement March 8th, at Macaulay's Theatre, the graduating class consisting of John H. Buschmeyer, *George W. Buschmeyer, Isidor Flexner, J. K. Higgins, J. D. Jansing, H. C. Leinberger, F. W. Leonhardt, F. P. Schneider, H. P. Tracy, J. Weinedel, Will Zubrod, Kentucky; Henry Gauss, Jesse Louis, G. E. Mergell, Indiana; *F. C. Robinson, Missouri;* J. S. Wells, Florida.

Prizes were carried off (five by Mr. Wells) by the graduates marked *.

The St. Louis College of Pharmacy had its twenty-third annual commencement. Oscar F. Baerens, Adolph H. Behrens, Gottlieb L. Blum, Sherman L. Bowman, Joseph T. Carey, Elmer F. Davis, Henry L. Goodman, Frank J. Hartmiller, Rudolph Heine, Hugo Herold, Albert J. Kopf, Henry W. Kroeker, Benjamin H. Levy, William H. Loomis, Wallace S. Macfarlane, George R. Merrell, Emil L. J. Naumann, Clarence M. Nicholson, Frank Birch Nickey, Thomas M. Ogilvie, John A. Peetz, Walter S. Polland, George E. Remick, Henry C. Reynolds, Henry E. Schmidt, Arthur Schrumpf, Emil W. Schwambach, George C. F. Seidlitz, John S. Kaer, Edward Streicher, Owen T. Stratton, George Henry Swift, John Walker, James T. Wortham. A gold medal was awarded to H. L. Goodman, and two prizes to J. T. Wortham. The recipient of the Junior class prize was O. A. Hornback.

The Connecticut Pharmaceutical Association held its thirteenth annual meeting at Hartford, February 5 and 6. President Daboll presided and read a business-like address. The Treasurer reported the finances of the Association to be in a healthy condition, $1200 being invested in bonds. Reports were also made by the Secretary and the standing and special committees, and papers were read on "Education of Pharmacists," by D. G. Stoughton, and on "Practical Pharmaceutical Notes," by J. K. Williams. A resolution was adopted directing the appointment of a committee to confer with the faculty of Yale Medical College with the view of providing facilities for the education of young pharmacists. The Secretary of the Association, F. Wilcox, was elected a delegate to attend the next meeting of the American Pharmaceutical Association, his traveling expenses to be paid from the treasury. A committee was appointed for elaborating a plan by which all licensed pharmacists would become members of the Association.

The next annual meeting will be held in Danbury in February, 1890. The present officers are: President, D. G. Stoughton, Hartford; Vice-Presidents, L. E. Southworth, Southington, and J. M. Brewer, Norwich; Treasurer, L. H. Goodwin, Hartford; Secretary, F. Wilcox, Waterbury; Local Secretary, T. G. Bodine, Danbury.

An Association of Pharmacists of Dallas, Texas, has been formed with the primary object of extending hospitalities to the State Association on the oc-

casion of the meeting of the latter, May 14. It is the intention that the local organization be continued. Mr. J. L. Williams is the presiding officer.

The American Medical Association will hold its fortieth annual meeting at Newport, R. I., commencing June 25. The Chairman of the Committee of Arrangements is Dr. Horatio R. Storer. An exhibition will be held of articles in which physicians may be interested; the arrangements for this exhibition are in the hands of a sub-committee, of which Chas. A. Brackett, of Newport, R. I., is Chairman.

EDITORIAL DEPARTMENT.

The Excursion to the Pacific Coast.—The chairman of the Committee on Arrangements has secured special rates for an excursion to San Francisco and return, starting from New York June 13th, via the West Shore Railway to Chicago, and via the Chicago and Northwestern Railway through Illinois, Iowa and Nebraska to Denver; thence to Manitou and Colorado Springs. It is intended to spend about two days each in Denver and Manitou, and then travel via Pueblo, the Grand Cañon of the Arkansas, the Marshall Pass (10,852 feet above the sea), the Black Cañon of the Gunnison, etc., to Salt Lake City, where a halt will be made for one day, when the journey will be resumed via Ogden and Reno to San Francisco, reaching that city early on Sunday morning, June 23d. On the return trip it is proposed to visit Portland, Tacoma, Seattle, Victoria, and the Yellowstone National Park, spending five days in the latter. The remaining portion of the return trip passes through Montana, Dakota and Minnesota to Chicago.

The fare for the round trip from and to New York will be $135, to which must be added $15 for the trip from San Francisco to Portland, $5 for the trip to Victoria, and $41 for sleeping-car accommodations. Meals are not included; but full hotel accommodations are included in the cost of the Yellowstone Park trip, which will be $40 for the five days.

While the rates announced in the circular—which may be obtained from Prof. E. Painter, Broadway and 34th St., New York—are for New York City as the starting point, members and their friends may join the party at the various stopping places, and, we presume, that particulars as to the fare from other cities will be announced in a short time.

Changes of Meetings of State Associations.—Thus far we have received notice of two changes in the dates of meetings, for the purpose of enabling members to attend also the meeting at San Francisco. The New York Association will meet at Binghamton, June 4th, and the Pennsylvania Association at Scranton on the same day.

Manufacture of Chloroform.—More than fifty years ago Liebig demonstrated that on heating acetone with chlorinated lime in the presence of water chloroform was produced. Owing to the high price of acetone this discovery was only of scientific interest until of recent years acetone was largely and cheaply manufactured from acetates for various purposes in the

arts, and was also utilized for the manufacture of chloroform, for which purpose the derivative of distillation of wood is a far cheaper source than alcohol. Dr. G. Michaelis having secured a patent for the manufacture of chloroform from products of dry distillation containing various ketones beside acetone, suits were commenced against manufacturers using the latter. On Thursday, March 28th, Judge Butler, of the United States Circuit Court, filed his opinion in this chloroform case with the Clerk of the Circuit Court at Trenton, N. J. The case had been before the Court for three years, during which time Messrs. Roessler & Hasslacher, of New York, had been restrained in the manufacture of chloroform by an injunction on an infringement issued in favor of Michaelis and others, who claimed damages amounting to nearly a quarter of a million of dollars. The latter phase of the case was for contempt, of which the defendants have been purged by the opinion just rendered, and the case dismissed.

The Royal Academy of Sciences at Turin announces that in the competition for the seventh Bressa prize, according to the testator's will, scientific men and inventors of all nations will be admitted; and that the prize will be given to the scientific author or inventor, whatever be his nationality, who during the years 1887–90 "according to the judgment of the Royal Academy of Sciences of Turin, shall have made the most important and useful discovery, or published the most valuable work on physical and experimental Science, Natural History, Mathematics, Chemistry, Physiology and Pathology, as well as Geology, History, Geography and Statistics." The term will be closed at the end of December, 1890. The value of the prize amounts to 12,000 Italian Lire. The prize will in no case be given to any of the National Members of the Academy of Turin, resident or non-resident. The announcement is signed by the President of the Royal Academy, A. Genocchi, and by the Secretary of the Committee, A. Naccari.

OBITUARY.

William James Martin died in Cincinnati, February 7th, aged 49 years. He had been engaged in business in Cincinnati for a series of years, and was an active and efficient member and a former treasurer and president of the College of Pharmacy of that city.

Dr. William Weightman, Jr., died in Philadelphia, February 11, aged 43 years. He had studied medicine, but for a number of years was actively connected with the firm of Powers & Weightman.

John Williams died in London, March 3, aged 65 years. He served his apprenticeship with the late Thomas Morson, was one of the earliest students of the School of Pharmacy of the Pharmaceutical Society of Great Britain, and passed the examinations with honor in 1844. With Mr. Hopkin he established the firm of Hopkin and Williams, which was carried on for nearly forty years. In 1870 he became a member of the Council of the Pharmaceutical Society, and served for several years as treasurer and as president. He has also been president of the British Pharmaceutical Conference. Mr. Williams was the author of numerous valuable papers on subjects connected with pharmacy and pharmaceutical chemistry, many of which were republished in this Journal, either in extenso or as abstracts.